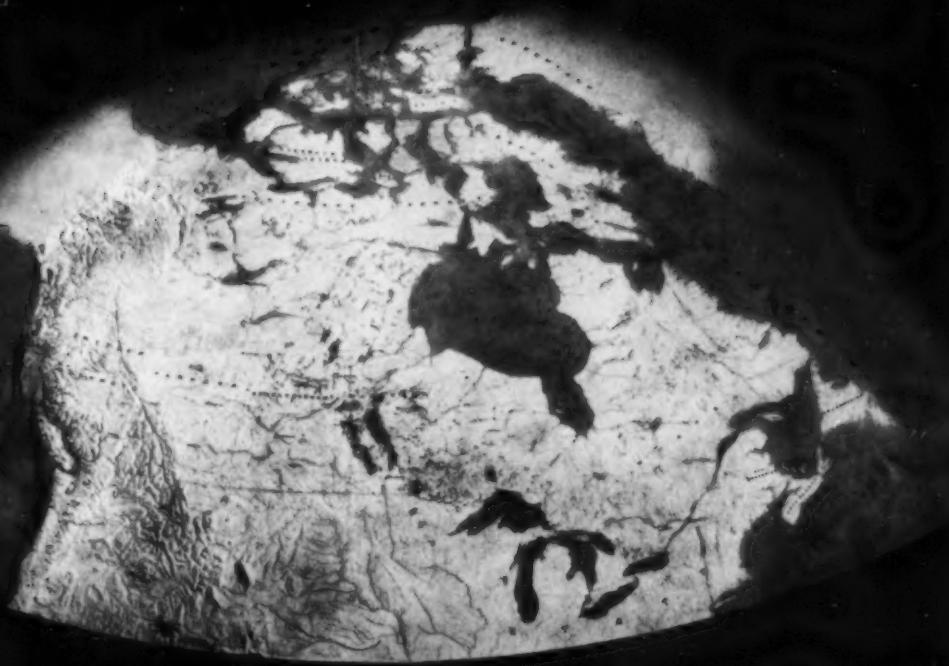


CANADIAN GEOGRAPHICAL JOURNAL

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The Canadian Geographical Society

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The Society's ambition is to make itself a real force in advancing geographical knowledge, and in disseminating information on the geography, resources and peoples of Canada. In short, its aim is to make Canada better known to Canadians and to the rest of the world.

As one of its major activities in carrying out its purpose, the Society publishes a monthly magazine, the Canadian Geographical Journal, which is devoted to every phase of geography—historical, physical and economic—first of Canada, then of the British Empire and of the other parts of the world in which Canada has special interest. It is the intention to publish articles in this magazine that will be popular in character, easily read, well illustrated and educational to the young, as well as informative to the adult.

The Canadian Geographical Journal will be sent to each member of the Society in good standing. Membership in the Society is open to any one interested in geographical matters. The annual fee for membership is three dollars in Canada.

The Society has no political or other sectional associations, and is responsible only to its members. All money received is used in producing the Canadian Geographical Journal and in carrying on such other activities for the advancement of geographical knowledge as funds of the Society may permit.

CANADIAN GEOGRAPHICAL JOURNAL

Editor

Gordon M. Dallyn

172 WELLINGTON STREET, OTTAWA

This magazine is dedicated to the interpretation, in authentic and popular form, with extensive illustration, of geography in its widest sense, first of Canada, then of the rest of the British Commonwealth, and other parts of the world in which Canada has special interest.

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The British standard of spelling is adopted substantially as used by the Dominion Government and taught in most Canadian schools, the precise authority being the Oxford Dictionary as edited in 1936.

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THE YELLOWKNIFE MINING DISTRICT

Illustrating the influence of mining on Canadian geographical history*

WE are opening up a new mining field in Northern Canada and I want to refer to the development in that field as an illustration of the extraordinary influence that mineral deposits and mining have exerted on the economic geography of this country, indeed as they have had over the whole world.

Two important events of history were the invasion of Britain and the discovery of America. There is no doubt that in his invasion of Britain, Caesar was influenced by his knowledge of the tin deposits of Cornwall and the resources of iron elsewhere on the island. Humboldt says of the voyage of Columbus to America that he was not looking for a new continent, but that he sought a nearer way to the gold mines of Japan and the spice islands of the East. In more recent times the gold deposits of Australia and California attracted thousands of people to those countries and opened them up. So with the gold and the diamonds of South Africa.

It has so been throughout all human history that the prospector and the explorer have been drawn by the lure of minerals, mainly gold, to venture into the most remote corners of the earth and to settle there.

In Canada, the story is the same. The search for gold, in the first place, has taken our prospectors into the most remote parts of this country and, later, the discovery has drawn hundreds and thousands of adventurous spirits even into the most inhospitable regions.

Martin Frobisher's expedition to Baffin Island in the 16th century, when he was grubstaked by Queen Elizabeth, and Samuel Hearne's expedition to Coppermine River in 1771, were two outstanding examples in the early history of Canada of exploration induced by the lure of minerals. Later, discoveries of gold deposits were instrumental in opening up a large portion of Western and Northern Canada. For example, Fraser River in 1858, Cariboo in 1860, Rossland and Southern British Columbia in 1890, Klondike in 1896, Cobalt in 1903, Porcupine in 1909, Kirkland Lake in 1912, Flin Flon in

1915, Noranda in 1921, to be followed by the whole Quebec Gold Belt. All of these discoveries had tremendous economic consequences. Later developments such as at Little Long Lac, Red Lake, Pickle Lake, God's Lake and elsewhere throughout Northern Ontario and Quebec, are also important but the effects of these developments are not yet fully realized.

Now we have the gold developments at Yellowknife on the north arm of Great Slave Lake under conditions that are considerably different from these others; different because of the isolation of the field, its lack of all-the-year-round transportation for heavy materials and the absence of adequate agricultural and forest resources in the immediate vicinity to provide for permanent continuing industries.

These things make Yellowknife somewhat different from other mining fields and present problems of administration that require considerable care and thought to master. We can plan in Yellowknife for next year and the year after and soothe ourselves by saying "sufficient unto the day is the evil thereof", but that is not enough. On account of its geographical location, its climatic and human conditions, we must endeavour to look farther ahead and try to foresee and plan for 10, 20 or even 50 years, when perhaps the mineral deposits will be exhausted and provision will have to be made for the maintenance of the population both white and Indian.

Let me now endeavour to give you a picture of Yellowknife and then see what conclusions can be drawn.

The Yellowknife country lies on the east side of the north arm of Great Slave Lake. Its aboriginal inhabitants are a small group of Indians known as "Yellowknives" who hunt and trap in the territory east of the lake and into the Barren Grounds. They number about 150 persons. The name "Yellowknife" comes from the use by the Indians of the metal copper which is found in the native state in the hills adjacent to the Coppermine River where they hunt. These are the

*Presented by Dr. Charles Camsell as his Presidential address to The Canadian Geographical Society, February 24th, 1939.

Upper left: — An abundance of rock outcrops and the absence of overburden makes an ideal setting for the prospector in the Yellowknife area. Camp in centre foreground was occupied by Dr. Jolliffe of the Canadian Geological Survey while mapping the area. Lower left: — Miniature company town — the living quarters of the staff and employees of the "Con" mine; surface plants at the property (left background).



Carelessness in the control of their camp fires on the part of those travelling over the Yellowknife area has converted much of what was a green forest two years ago into a blackened, smoking wilderness. The timber, though small and scattered, is needed for many purposes, and its destruction by fire means that the necessary supplies will have to be obtained elsewhere.

people who are going to be most seriously affected by mining at Yellowknife and the safeguarding of their future is going to require very careful consideration.

Alexander Mackenzie in 1789 was the first white man to see this country as he was on his way to explore the great river which bears his name. As a result of his visit a trading post known as Fort Providence was established near the mouth of Yellowknife Bay and this post was still in existence 30 years later when Franklin made his memorable but disastrous voyage to the Coppermine River in 1820. The post was abandoned shortly afterwards; and when the discovery of the Yellowknife gold deposits was made about 4 years ago the nearest white establishment was the fur trading post at Fort Rae, about 60 miles to the north.

Gold was first discovered in this region in 1898 by some Klondikers. Since then, and up to 1934, sporadic prospecting failed to disclose anything of importance. In 1932, however, attention was drawn to the mineral possibilities by Dr. Stockwell of the Geological Survey when making a

survey of Yellowknife River. It was the Survey's work of 1935, under Dr. Jolliffe, which, while recommending the prospecting of some 3,000 square miles of country, was directly responsible for more important discoveries and for the rush which followed these discoveries.

As soon as prospectors realized the importance of the field an urgent demand for topographic and geologic maps followed; a demand which the Geological Survey, with the help of the Air Service of the National Defence Department, was able to fully meet. To-day we have air photographs of 165,000 square miles in the Northwest Territories, an area twice as large as Great Britain and Northern Ireland, and we are adding to this at the rate of several thousands of square miles a year. In no other field has the Geological Survey done such useful and effective work, both in pointing the way to mineral discoveries and in the rapid production of geological maps for the use of the prospector.

By the end of January, 1939, a total of approximately 4,000 mineral claims



View of the Negus mine which entered production in February last. By the end of April the company's 50-ton mill had produced gold to the value of approximately \$138,000. The "Con" property may be seen in the distance.

had been staked within an area of 3,000 square miles in the Yellowknife region. There are two gold mines in production, the first gold brick having been poured on September 5, 1938, and a great many properties under development. Practically all the large mining groups in Canada, as well as some United States mining companies, have interests in the region.

The country is typically pre-Cambrian; rocky with numerous lakes, practically no overburden of soil and a very sparse cover of forest. It is very easy to prospect and some of the discoveries were actually made from the aeroplane.

Whereas 4 years ago there was only a small Indian village on Yellowknife Bay, to-day there are probably 1,000 people in the district, most of them centred at Yellowknife village, which has been subdivided into a townsite of 125 lots. Here is the usual collection of buildings that characterize a frontier establishment—viz., stores of various kinds, eating houses, warehouses, hotels, tents, and private dwellings. Conditions are still pretty primitive and problems of water supply and

sanitation, of education and government, are becoming pressing. There is a good aerial mail service and radio telegraph service, which keep the people in touch with the outside world.

The problems that have to be faced by operators at Yellowknife are those of transportation, fuel, power and climate.

Passenger travel from Edmonton, 800 miles away, is almost exclusively by air. Mail and express move the same way. Heavy freight, however, goes by boat from the railway at Waterways, down the Athabasca and Slave to Fitzgerald, then across 16 miles of motor road to Fort Smith; then down Slave River and across Great Slave Lake to its destination, a total distance of about 600 miles, at a cost of from \$50 to \$60 per ton. The need for a longer period of heavy transportation beyond the period provided by summer navigation has induced the Government to open a winter road to the mouth of Hay River connecting with the railway at Peace River Crossing. At the same time improvements to river navigation are now being made.

The fuel used is mainly wood, though some oil from the oil wells at Fort Norman, 600 miles away, is used for this purpose.

While there are a number of undeveloped water-power sites in the locality, aggregating altogether some 25,000 h.p., power is at present being developed from the burning of oil brought from Norman. The requirements this year will be about 1,000,000 gallons.

Climate is not a serious handicap, though temperatures occasionally reach 40° or 50° below zero. In spite of the idea prevalent in certain quarters that residents of the Northwest Territories are "God's frozen people", there is nothing in the climate of that region to prevent people carrying on the same activities all the year round as they do in the City of Ottawa. Underground operations are of course very similar when you get deep enough to reach a more or less uniform temperature.

Forest resources are limited and there are no opportunities for agricultural development. Great Slave Lake, however, has an abundance of fish and the northern cariboo herds have in the past migrated southward through the district. Fur-bearing animals are not very plentiful.

The question facing the administration of this region is this — Supposing the mineral deposits prove to be important and a number of mines are developed, for what condition of the country and its people must we plan? All mines

ultimately become exhausted and with limited forest resources and an absence of agricultural possibilities, on what continuing resources can the life of the people be based when the mines are worked out? That is the question that faces us, and it faces us in the case of all mining fields in the Far North.

In so far as the mining population is concerned and those dependent on this industry, the people will move to newer mining fields in the Territories as these are discovered, and they will start over again. In so far as the native population is concerned, whether white or Indian, those who consider this north country as a permanent home, the answer to their problem, we believe, lies in the preservation and cultivation of those indigenous natural resources, game, furs and fish, as reproduce themselves annually. To this end, the Administration of the Northwest Territories has set aside for the preservation of the game and fur-bearing animals, vast tracts of country, aggregating some hundreds of thousands of square miles in which only natives and other permanent residents can hunt and trap. In addition a beginning was made last year of a programme of muskrat and beaver cultivation with a view to increasing the number of these fur-bearing animals in suitable locations. Such a policy, we feel, will assure the future of those who are permanent residents of the Northwest Territories.



Royal Canadian Corps of Signals' station at Yellowknife townsite, operated by the Department of National Defence, Ottawa. The station is in constant contact with all planes.



Air base, Canadian Airways Limited, at Yellowknife townsite. Barrels in foreground contain gasoline supply for aeroplanes. Two general stores under construction.

Municipal seaplane base at Cooking Lake, 26 miles south-east of Edmonton, Alberta. A total of 11,000 passengers and 3,100,000 pounds of freight were flown north from Edmonton in 1938.





Transport facilities on the Mackenzie River. During the summer months, high grade radium ore and concentrates are shipped from Eldorado's mine at Labine Point, on Great Bear Lake. The M. V. "Radium King" and its barges convey this valuable cargo up the Mackenzie to the 16-mile portage at Fort Smith. Here the freight is hauled overland to the M. V. "Radium Queen"—illustrated above with its barges on Slave River—which carries it to the railhead at Waterways. Both the "Radium King" and "Radium Queen" were built at Sorel, Quebec, on the St. Lawrence River, dismantled and shipped by freight car to Waterways, where they were reassembled.

Waterways, end of steel and gateway to the Northwest Territories. Hudson's Bay Company warehouse in centre foreground.





General view of Yellowknife area, Jolliffe Island in foreground.

Yellowknife townsite, a community of several hundred people which owes its existence to mining operations in the area. At the right of the large island in background is the "Con" gold mine, which poured its first gold brick early in September, 1938.





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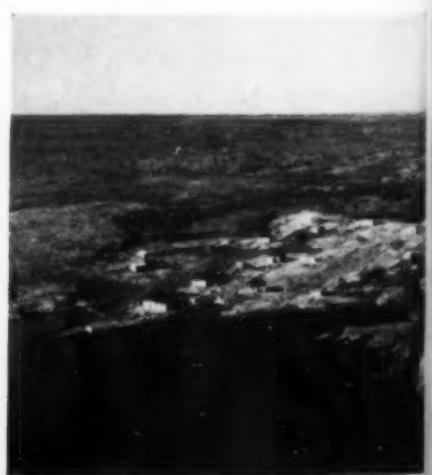


3

1. Upper portion of rapids on Yellowknife River at the outlet of Prosperous Lake.

2. View showing portion of 16-mile portage made necessary by rapids in Slave River at Fort Smith. Supplies are freighted over the portage by motor trucks.

3. Down-stream view of rapids on Yellowknife River at outlet of Prosperous Lake.





4. Indian settlement at the mouth of Yellowknife River, about $3\frac{1}{2}$ miles from townsite of Yellowknife.

5. A view of Canadian Airways' "Box Car" at Yellowknife. The huge air freighter has a payload of 4,200 pounds and is used by the company to handle special contracts for the transportation of machinery and equipment to northern mining areas.

6. Gold milling plant on Consolidated Mining and Smelting Company's "Con" property, the initial output from which represented the first commercial production of gold in the Northwest Territories. By the end of April, 1939, the property had produced the metal to a total value of approximately \$468,000. The capacity of the mill is to be increased to 150 tons of ore daily.

CANADA IN RELIEF

by D. A. NICHOLS

RECENTLY there has been placed on exhibit in the main rotunda of the National Museum of Canada, a Relief Map of Canada on the scale of 1 inch to 23.7 miles, with a vertical scale of 1 inch to 8,330 feet. It has been designed to show, in relief, the broad physical features of Canada on a portion of a sphere in exact proportion to the actual curvature of the earth.

The assembled map is over five and a half feet high, with a floor radius of about 11 feet, and embraces one quarter of the northern hemisphere north of 40 degrees of Latitude between the 51st and 141st degrees of west Longitude.

The general base maps used for the construction of the model were the 60 miles to 1 inch map of Canada, and the map of the Northwest Territories on the same scale. The projections for the map were drawn after calculating the distances between each ten degrees of Latitude and Longitude, since the model is built up in ten degree sections. Since the depths of the oceanic areas are shown, the base on which the sections are placed had to be calculated for a sphere with radius 3.4 miles less than the actual radius of the earth. Using this as datum, the topography of the oceanic parts were built up to sea level, and then land topography added. Hence, when the individual sections were placed on the framework, the correct curvature of the earth and the position of sea level were retained, and the sections fitted on the modified spherical framework.

For building up the relief on the map, all available contoured maps were first used and brought to the scale of the relief model, and the contours transferred to the projection sheets. The drainage pattern of the remaining portions were then out-

lined, and spot elevations placed on the uncontoured parts in their correct geographic positions. These elevations were obtained from all available sources, such as route maps made by explorers; township plans and base-line traverses; railway surveys; hydrographic plans and charts; recent corrections to the coasts of Baffin Island and Labrador, and aerial photographs which gave some idea of the character of the terrain.

Having assembled all this data, the contouring on the projection sheets was completed. The contours were transferred to cardboard sheets of appropriate thickness to build up the contour interval, for instance,—cardboard one-tenth of an inch in thickness equals 833 feet in elevation. The sheets were then cut, first along the lowest contour line and this was placed on a frame which was made to conform exactly to the curves of the ten-degree sections. The next higher contour was then traced, cut, and placed on the preceding one, and so on, with each, until the highest elevation was reached. This formed a model built of several sheets of cardboard with steps intervening between each layer. These steps were then graded with beeswax, in which was carved any minor detail that it was impossible to cut in the cardboard. Expressive interpretation of many parts of the terrain was given by the writer's personal knowledge of the areas from sketches made in the field, especially in several parts of the Arctic Islands and in the Cordilleran areas of the West. The assembled model was treated with shellac, placed in a frame and a mould made by pouring plaster of Paris over it. A cast was made from the mould, with thickness calculated to retain the curvature and make each section fit the adjacent ones when

Figure 1.—Frame and build-up of one of the ten degree sections of the large Model of Canada. (1) The wooden frame with curve built to the shape of the permanent framework of the Model. (2) The layers of cardboard cut to the shapes of the contours and built up on the frame to the correct height and shape of the land forms of that portion of the Model. It was treated with shellac before the plaster of Paris was poured over it to form the mould shown in Fig. 2.



placed on the large framework. When all the sections were fitted together, the joins were sealed with plaster, and the whole model painted. The land area is buff, and water areas, robin's egg blue, while the glaciers and ice-caps are covered with flaked glass to simulate ice and snow. The drainage and cultural features are draughted on the painted surface.

The completed relief map is panelled with mahogany and protected by a railing. It is illuminated by cross lighting to bring out some of the finer details of relief.

Some of the striking features shown on the map are,—the immensity of the Cordilleran area of Western Canada, with the great Rocky Mountain Trench separating the Rocky Mountains from the more westerly mountain groups; the peculiar drainage of the Mackenzie River system; the more or less persistent escarpment between the Great Plains and the Canadian Shield; the marked belt of lakes and rivers bordering the eastern side of this escarpment from Great Bear Lake to Georgian Bay; the shallow epicontinental Hudson Bay with the deeper Hudson Strait connecting it to the Atlantic Ocean; the immense depression in Baffin Bay, 3 miles deep; the Lowlands around the peninsula of Western Ontario and St. Lawrence River; the extension of the Appalachian system of mountains through Gaspé and into Newfoundland; the submerged canyon of St. Lawrence River and Gulf; the Continental Shelf around Nova Scotia and

Newfoundland, which extends out 150 miles, in places, with a depth of about 650 feet and less, to a steep submarine cliff which drops abruptly to depths of 6,000 feet and over; the elevated and intricately fiorded coasts of Labrador and Eastern Baffin Island; the extensive Arctic Archipelago, with its maze of through straits and its peculiar pattern of channels separating the islands; and the ice-caps of Greenland, Baffin and Ellesmere Islands.

Since the map takes in a considerable portion of the United States, the interrelation between the topographic forms of Canada and our southern neighbour are shown. There is depicted the great line of extinct volcanic cones from Mt. Baker to Shasta; the Columbia River Plateau; the Snake River desert; the Basin and Range areas; the Black Hills dome; the Great Plains; Champlain and Connecticut valleys and the folded Appalachians.

Many other interesting physical features are shown, for it is not merely an attractive looking exhibit. It is intended to be highly educative in many ways, and should prove to be of great value to students and teachers of Physical and Commercial Geography, and should be of educational value to all.

The Relief Map was built under the supervision of the Topographical Survey, Department of Mines and Resources, and was designed and its construction supervised by the writer.

Figure 2.—In Fig. 2, all the elevations of Fig. 1 show as depressions. Plaster poured over this gives an exact replica of Fig. 1 in plaster. This was retouched and placed on the frame and adjusted to the adjacent sections of the Model.





CANADA



NADA



HISTORIC FINLAND

by E. R. YARHAM

UNTIL recently Finland was considered to lie too much on the fringes of civilization to attract the attention of the world.

Fortunately during the last decade, with the rapid improvements in communication, Finland has come into her own. Well away from the beaten track, the charm of her people, their gracious hospitality and anxiety to please all visitors, are becoming by-words among travel-loving races. For camping, fishing and the study of wild life, Finland is unsurpassed, and the story of her people is one of the great legends of European history. In addition, her claim to be one of the finest winter sports grounds to be found in any European country has been more and more recognized.

Since 1917 Finland has been a free country, and the intense pride her children feel for the motherland makes them anxious to reveal her charms.

It is easy to reach Finland from any part of Europe, by steamer, or train, or finishing the journey aboard one of the comfortable flying boats to Helsinki (Helsingfors), when wonderful views are obtained of the rugged archipelago with its forest-clad shores. In the country itself there is room and to spare even for the most avid sight-seer. There are the ancient and historic cities of the southern seaboard; the veritably marvellous area of the lake district — for Finland has been termed "The Land of a Thousand Lakes" — and actually there are over 60,000 of them; the magnificent forests of birch, spruce and pine; and away to the north the truly Arctic district, with its Lapps and reindeer.

That a nation should be able to preserve its integrity and traditions through a thousand years of dependence, is proof of the greatness of its people. Nowhere is the national heritage more enshrined than in the ancient capital, Turku (Abo); next to it comes Viipuri (Viborg), which has had more than its share of fire and sword; and delightful old Porvoo (Borga), the home of Finland's national poet, Runeberg.

For six centuries Finland was part of Sweden, and then lay uneasy beneath the

military rule of Russia, until the Great War, after which she was able to assert her independence. The spirit of her people, proud and unbroken through a thousand years of repression, is not only evident in the ancient cities, but in the new capital, Helsinki, which also typifies the wonderfully energetic character of the nation. A century ago Helsinki could only boast a population of four thousand. To-day it has over a quarter of a million. Her children are determined to make the city the most beautiful in the North. A magnificent House of Representatives has been erected, with material of Finnish origin.

The approach to Helsingfors is beautiful, thousands of forest-studded islands lying in the myriad bays which dot the broken coast-lines. The city is invisible until the steamer glides through the only entrance, guarded by two sentinel walls of granite, after having threaded its way through many islands. The first thing which strikes the visitor is the spotless cleanliness of the city. Travellers who have arrived aboard a national steamer will have been forewarned from its appearance, but others will have a pleasant surprise. It is not only the main streets which are clean, but there seem to be no slums, and every part of the town seems as if it were awaiting some grand fête. This pleasing characteristic is not confined to Helsingfors alone but is common to every little town and village. The phenomenon is repeated in the people themselves, for they have a passion for bathing; the bath is a national institution — every village, farm-house, or large private residence has its log bath house — and the bath is often a family affair.

Helsinki was founded about four centuries ago, but not until the last century when it supplanted Turku as capital, did its mushroom growth begin. Now it has wide streets, many parks and prettily laid out gardens. The Finn has evolved an architecture of his own, without sticking slavishly to modern or ancient conventions. The Senate House, Cathedral, and University are all buildings of



One of Finland's historic castles at Turku.

architectural distinction, but the even newer buildings break further away still from the concepts of former centuries. A striking example of the new ideal is the railway station, others are seen in modern business buildings, which seem to have become imbued in some mysterious fashion with the national ideals and aspirations.

Abo, 170 miles to the west, can be approached by rail or sea. This ancient city is the cradle of Finland's culture and civilization. The magnificently guarded harbour of Helsinki is now termed the "Key to the North." The massive castle at Turku, built as far back as the twelfth century, was once called, the "Key to Finland." From the galleried hall in the centre it was the custom of the reigning chief to hurl his captives to death. Lying on the south-western seaboard, many an invader has been repulsed from its frowning walls. Comparable with this historic building is the Cathedral, founded in 1258. Like the castle, its square tower and plain walls express a rugged strength which has defied centuries of peril and conquest. It was at Turku that the University was founded in 1640, but just over a century ago a terrible fire devastated the town, and it was transferred to Helsinki. In 1918

a new one was founded, and another in 1922.

Quaint old Porvoo is only a few hours' steamer trip from the capital, and it is an outing which should not be missed. She is old-world, and is content to remain so, with her wooden buildings and mellow cathedral. Perhaps she is proudest of all as being the home of the great poet, Johan Ludvig Runeberg. His home is now the property of the town, and is an object of pilgrimage from thousands of his admirers every year. He lies buried on top of a green hill, tree shaded, looking out over a landscape typically Finnish, such a one as his poetry has made immortal, and in which the national spirit of the nation is inimitably perpetuated.

Far away to the east, on the borders of Russia, lies that other ancient town, the fortress citadel of Viipuri. Its venerable castle has sustained nearly seven centuries of siege and assault, for it was the last national outpost against Russian invasion. The solitary tower, standing in the heart of old Viipuri, is probably the oldest remnant of the once enormously strong walls which surrounded the town. Forlorn as it is, it stands as a reminder of stormier days, and less happy ones than those which now bless this gallant and noble-spirited people.



Above:—Helsinki, capital of Finland.

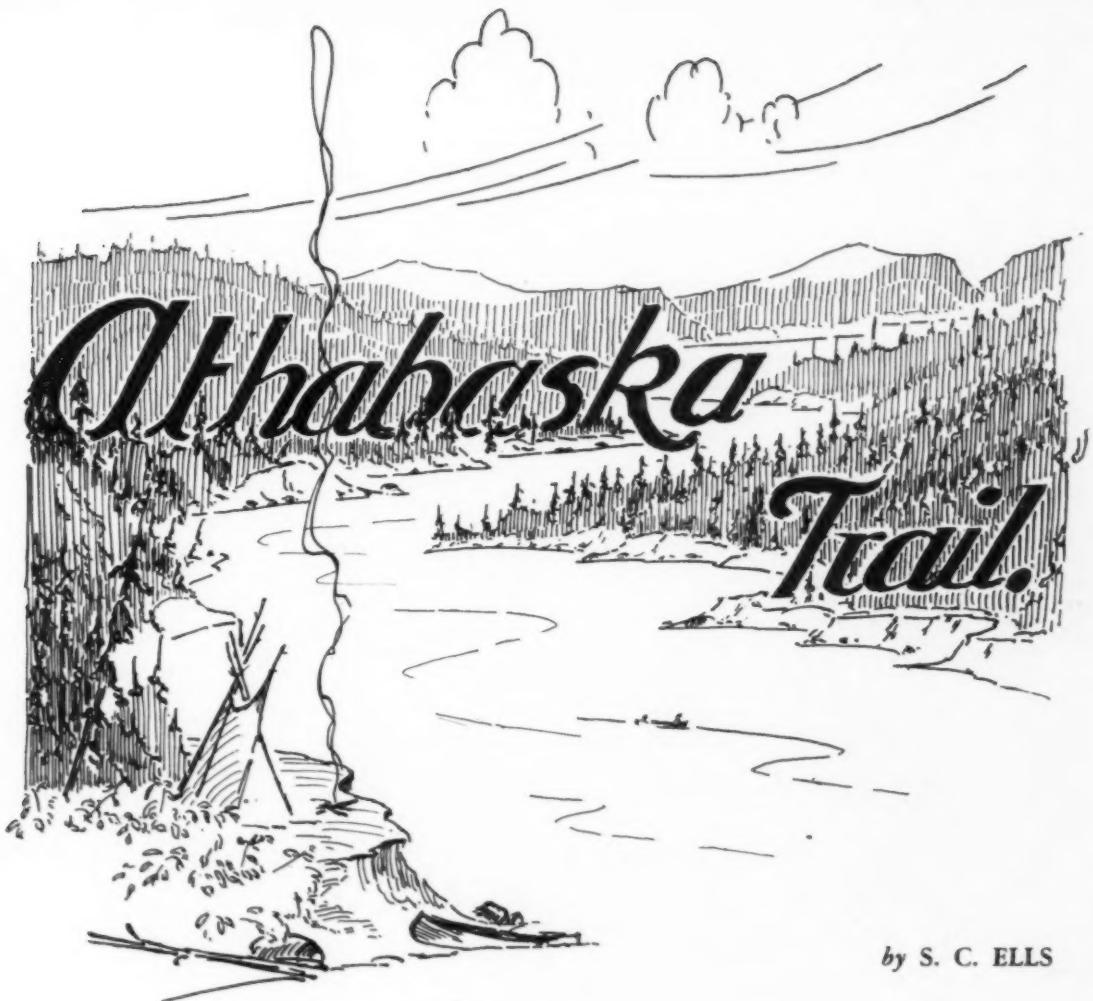
Right:—Kolita Lapp woman.

Below:—The ancient town of Porvoo.





Ells



by S. C. ELLS

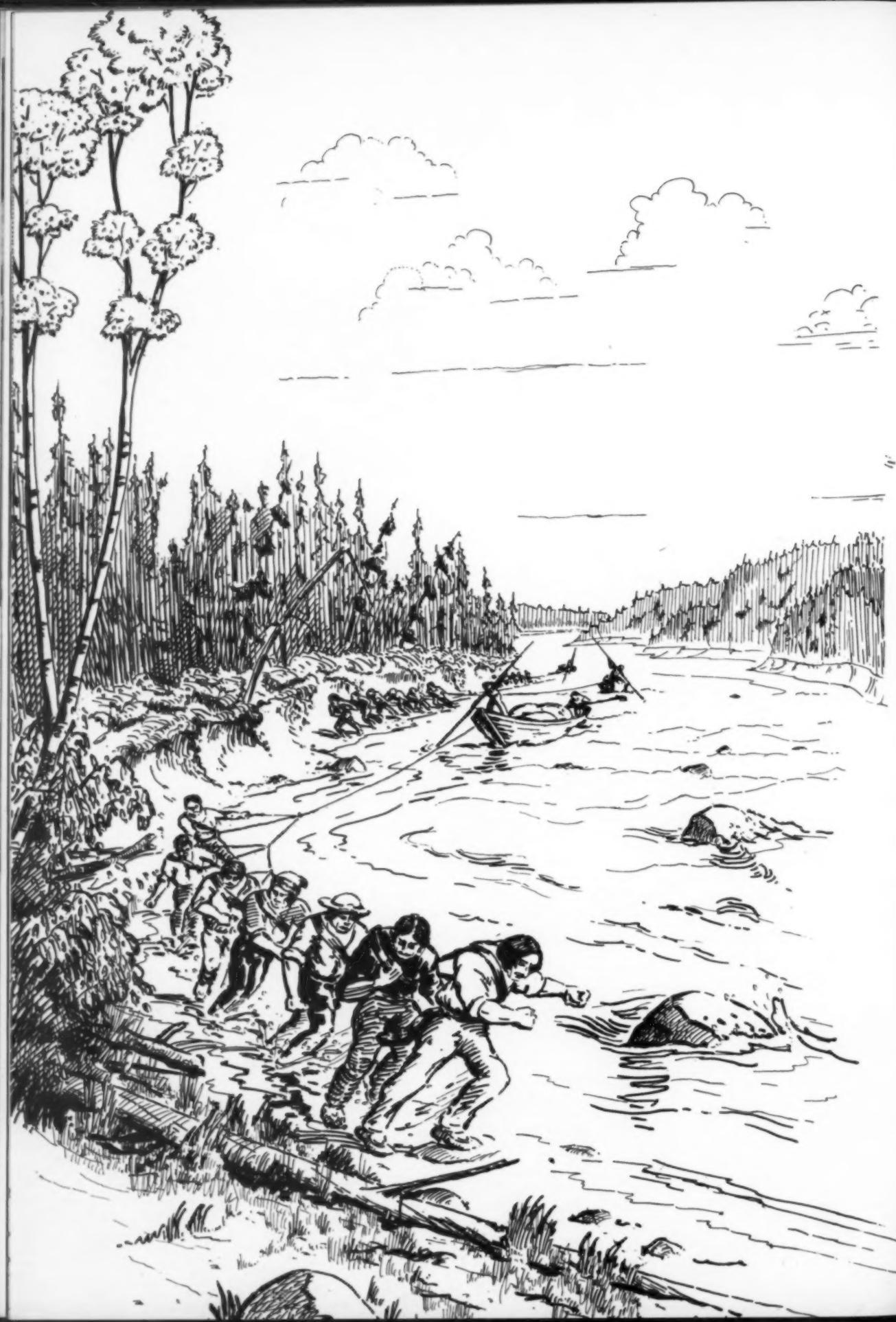
(Illustrations by the Author)

NOTE.—In 1913, 1914, and 1915, the writer handled his own scow transport between Athabasca Landing and McMurray. For information regarding certain events prior to 1913, acknowledgment is made to Col. J. K. Cornwall, a pioneer of steamboating days on the Upper River, to Mr. John Sutherland, engineer and chief engineer with the Hudson's Bay Company for more than fifty years, and to Mr. Howard Stutchbury, late Trade Commissioner, Province of Alberta.

"There's many a trail winds away to the northward,—
Through swamp and muskeg and bottom lands wide,—
But the trail which once carried the wealth of the Northland
Was the trackers' trail by the river side;
Gone are the trackers, coiled are the track lines,
But still, of a night, as the mist settles down,
I see that long trail winding down to the Northland
And call back the past . . . and the men who are gone!"

From "Northland Trails"

Left:—The heavy work made tracking one of the most brutal forms of labour.



FEW countries have witnessed such rapid advances in the matter of transportation as have taken place during comparatively recent years within the Athabaska-Mackenzie basin¹. Inevitably this development has radically affected the character of the people and their mode of living. Where, as recently as twenty-five years ago, the march of events kept pace with the slow toil of scow and track line, the tempo of life is now attuned to the song of the aeroplane. With the development of the steam engine, and later of the internal combustion engine, travel has quickened more in a few short years than in all previous history.

For many centuries, in what is now referred to as Northern Canada, the primitive floating log — and later the canoe — were the principal means of transportation on a mighty labyrinth of lakes and water-ways. But the canoe reached its maximum development and, following the advent of the white man, its use was challenged by York boats. Still later, square-ended scows, large and small, with their flexibility, shallow draft and greater cargo capacity, gradually drove York boats from lake and river. Finally, the laboured panting of steam, and the sharp staccato of the internal combustion engine drowned the *chansons* of hardy *voyageurs* who once manned canoes, York boats and scows.

In 1778, Peter Pond crossed La Loche summit, and for more than one hundred years the traffic of the fur trade of the Far North flowed across La Loche portage. In 1789, Alexander Mackenzie performed the then amazing feat of descending the Mackenzie River to its mouth. The route which he then followed has become one of the great air and water routes of the world. In 1857, Archbishop Taché blazed a trail westward from Lac La Biche and down Athabaska River to Fort McMurray. For more than forty years, this section of the Athabaska was to constitute a vital link in a great water-ways system, nearly two thousand miles in length.

1) In 1938, forty-five aeroplanes were in regular service from Edmonton to McMurray and points north. North of McMurray itself, water transportation facilities included four steamers, twenty-four power tugs, and forty-nine barges.

(2) See Canadian Geographical Journal, March 1936.

(3) Anticipating the approaching termination by the British Government of the Company's exclusive right to trade with Indians which was to end in 1859, the number of "free traders" was rapidly increasing.

(4) This was originally an Indian trail which, in 1875, had become passable for buck boards and light wagons. It was greatly improved by the Hudson's Bay Company in 1886, and made fit for heavy freighting wagons. Time required between Fort Edmonton and Athabaska Landing was four to six days, depending on weather conditions. The name "Athabaska Landing" was changed to "Athabasca" in 1905.

Left:—Crews of trackers fought their way grimly along the shores.

Roman Catholic Missions were first established on Lake Athabaska in 1845, and thereafter, for many years, mission supplies were forwarded by Hudson's Bay transport by way of La Loche (Methye) portage. But increasing demands for such supplies and the Company's own greater needs, due in part to increasing competition from "free traders"², ultimately overtaxed its transportation facilities. Finally, in 1856, Archbishop Taché decided to not only provide independent transportation for the missions, but also to develop a new transportation route. This new route was to connect Fort Pitt on the Saskatchewan River with Lac La Biche, and thence to continue down La Biche and Athabaska rivers to the present site of McMurray. Eventually, in 1867, the first organized party, consisting of missionaries, made the trip with baggage only, from Lac La Biche to Chipewyan. In the winter of 1868-69, the first shipment of freight reached Lac La Biche from Fort Pitt, and in May 1869, this shipment was forwarded down Athabaska River in a four-ton scow. During the succeeding twenty years, freight handled by the mission transport under the supervision of Bishop Faraud gradually increased. Indeed, at times, mission scows actually carried freight consigned to the Hudson's Bay Company, as for example, in 1887, when machinery was required for the Company's new steamer.

Meanwhile, until 1886, the Company's transport continued to use the old established route by way of La Loche portage. But in 1883, the Canadian Pacific Railway reached Calgary; in 1886 a wagon road from Fort Edmonton reached Athabaska Landing. The brave days of the famous La Loche portage were at an end; silence crept down the winding rutted road. A stirring chapter in the history of northern transportation had closed; a brief new chapter had begun. In 1886, freighting for the missions via Lac La Biche also ceased, and thereafter, until 1915, all freight, both for the Hudson's Bay Company and for

the Missions, was diverted through Athabaska Landing. But even in this brief period history was made; romance still lingered along the Upper River between the "Landing" and Fort McMurray.

Prior to the Union in 1821, the North West Company favoured the use of canoes, whereas the Hudson's Bay Company favoured the use of boats. Following the Union, the use of boats became general, although for many years afterwards canoes were still used for passengers and express. York boats were used between La Loche portage and Fort McPherson until 1886, but owing to their stiff construction and relatively deep draft, they were not adapted to the rough water of the rapids and the shallow water during low stages of the river between Grand Island and McMurray. Consequently, boats of scow design were introduced. These were originally known as "sturgeon-nosed" or "sturgeon" boats on account of the "spoon" or "shovel-shaped" bows, but later developed into the standard square-ended boats with long overhanging bow and stern. Their draft, when loaded, was about 2 feet, while capacity varied from 5 tons for 20-foot boats to 9 tons for 50-foot boats. At the bow, a short deck was provided for the bowsman, and at the stern an after-deck

for one or more steersmen. Owing to the stresses and strains to which scows were subjected, flexibility was an essential feature of their construction.

Following the advent of steamboat transportation below Fort McMurray in 1886, scows from the Upper River were usually broken up on reaching that point, the price paid for the old lumber being about \$10 per scow. It is estimated that 90 to 100 scows was the maximum number employed in any one year, although, in 1898, Klondikers took upwards of 200 boats of all shapes and sizes down the river. Prior to 1886, freight was forwarded to points north of McMurray by canoes and boats. In 1883, however, J. M. Smith commenced construction of the steamer "Grahame"; and for a number of years thereafter, this steamer operated between McMurray and Fort Smith. Her length was 135 feet, beam 24 feet, and capacity approximately 90 tons. In 1887, the first stern-wheel steamer began plying south of Grand Rapids, and thereafter the use of scows was largely restricted to the white water section of the river between Grand Rapids and McMurray. In 1908, two other flat-bottomed stern-wheel steamers, the "Midnight Sun" and the "Northland Call", were built for service on the Upper River between Mirror Landing and Grand Island. The "Midnight Sun" had a length of 99 feet and a cargo capacity of 50 tons, the northbound and southbound freight rate by steamer between Athabaska and Grand Island being \$1.25 per hundredweight. The above steamers were owned by the Northern Transportation Company (later a subsidiary of Northern Traders, Limited). In 1914, the "Midnight Sun" was run down to McMurray, where she was renamed the "Northland Echo", and her hull rebuilt by Capt. Matheson.

Steamers usually discharged cargoes at a point about four miles above the head of Grand Island. Except at periods of high water, the river is very shallow immediately above the island, and from time to time, subsequent to 1887, the Hudson's Bay Company effected improvements along the scow channel by removing boulders. Between 1911-1914, the Dominion Government attempted to improve the east channel opposite Grand Island by blasting. Time for steamers down-stream from Athabaska to Grand Island varied



The steersman.



Running the Little Grand Rapid.

At Grand Rapids boats were 'run' down the tortuous east channel.



from 15 to 20 hours, and from 48 to 60 hours up-stream.

From Athabaska Landing to the head of Grand Rapids⁵, a distance of approximately 160 miles, Athabaska River flows with a two to three-mile current, interrupted by only two short stretches of fast water at Pelican Rapid and the Rapid du Joli Fou. At Grand Rapids, however, there is a fall of 54 feet, two-thirds of which occurs within a distance of 2,200 feet. Grand Island itself is about one-half mile in length, and divides the waters into east and west channels. It was customary for scows to discharge the bulk of their cargoes at the head of the island, the scows themselves being "run" down the tortuous and boulder-strewn east channel. About 1890, the Hudson's Bay Company laid wooden rails, protected by strap iron, from the upper to the lower end of the island, and over this freight was moved on light push cars⁶. Between Grand Rapids and the "Forks" at McMurray, a distance of 85 miles, a series of heavy rapids occur⁷, the total descent being approximately 375 feet. At most of these rapids, spring, summer, and autumn channels were recognized, and experience and judgment were required in deciding which channel should be 'run'.

Already even the names of the chief actors in this stirring drama are for the most part forgotten. Then, one crouched, pole in hand, or pulled desperately at a great clumsy sweep of a lurching scow. In this day of so-called 'progress', one lounges comfortably for a few hours in chair car or sleeper, and it is, therefore, of interest to recall conditions under which Athabaska River transport moved less than thirty years ago.

At Athabaska Landing, the departure of a northbound brigade was usually celebrated in fitting manner, for crews might be absent for weeks or for months. Consequently, through the long northern twilight and until the morning sun peered down through the mists of the mighty Athabaska valley, tireless moccasined feet of man and maid kept time to screaming fiddle and throbbing drum. An early start

down river was thus out of the question, and consequently it was customary for brigades of boats, their cargoes sheeted over with heavy canvas covers, to drop down-stream for a few miles during the afternoon. At dawn, the following morning, the trip began in earnest.

There were, of course, no regular quarters for crew or passengers on the open scows, but men and women accommodated themselves as best they could among the bales and boxes of the cargo. In the early days — as had been the custom on the La Loche route — passengers were given the same food as the crews and provided their own shelter at night. Eventually, 'cook' scows were introduced, and a greater variety of food became possible⁸. As a rule, tents were not available, but mosquito bars and tarpaulins were used.

Between Athabaska Landing and the head of Grand Island, there was little work for the crews. Drifting down-stream, day and night, the journey usually occupied from three to six days, depending on head winds. At the foot of Grand Island, boats were reloaded and the descent of the long series of rapids began. This, indeed, was work which called for judgment, strength and skill. Each boat was equipped with a heavy steering sweep, 20 to 25 feet in length, the handling of which at times required the united efforts of three men. There were also four heavy rowing sweeps, and a bowsman equipped with a stout pole. In the fast water of the tortuous channels, the united efforts of the entire crew were required to prevent swamping or being smashed against boulders or rock ledges. With a good stage of water, the run between Grand Rapids and McMurray was sometimes accomplished in a single day, but not infrequently — especially at stages of low water — a week or even more was required.

It was but natural that the quantity of northbound freight should greatly exceed that moving south. Running cargoes from Athabaska Landing to McMurray had presented no really serious difficulties for experienced rivermen. But moving loads

(5) There were no company trading posts between Athabaska Landing and Fort McMurray, although at various times "free traders" maintained 'stores' at Pelican and at House River. David Thompson descended the Upper River in 1799, but prior to 1867 it was not recognized as a travel route.

(6) The Hudson's Bay Company maintained an official at the island during summer months, a charge of 50 cents per ton being made for the use of the 'railway'.

(7) Passing northward from Grand Rapids, the principal rapids were as follows: Little Grand, Brûlé, Boiler, Middle, Long, Crooked, Stoney, Little Cascade, Big Cascade, Mountain, and Moberly.

(8) During the early days, rations consisted chiefly of dried meat, pemmican, and soup. With the introduction of cook scows this was greatly amplified to include 'sow belly', flour, rice, dried apples, beans, tea, some sugar, and such fresh meat as could be killed.

up-stream between these points involved the use of tracking lines for the entire distance of approximately 240 miles. For 50-foot scows, the writer used one-inch manilla lines, 500 feet in length. To this line trackers were harnessed in tandem, and at close intervals, by leather or canvas breast straps. The man nearest the boat was known as the "wheeler", and his duty was to use all his strength and weight to hold the line in shore and to keep it clear of logs and other obstructions. The duty of the bowsman was to keep the boat clear of rocks and shallows, and when a craft grounded, to get beneath the overhanging bow and lift her off by brute strength. Consequently, in warm weather or in cold, he was constantly wet like the trackers themselves. The steersman exercised general supervision, and manipulated a long and very heavy steering sweep. No definite hours for trackers were observed, for men worked "western days"—daylight till dark. Crews usually pulled for three consecutive periods of fifty-five minutes each, with five minutes rest at the end of each period. At the end of each three-hour 'spell', they were given a meal—five heavy meals a day being not uncommon.

The usual tracking crew for a 20-foot scow was seven men, and for a 50-foot scow, ten men. It was customary, however, for boats to travel in 'brigades', and in really heavy water, crews from a number of boats could be temporarily combined on one tracking line. On one occasion, in 1913, as many as eighty men on a single tracking line were unable to make headway, their scow being swept away and completely wrecked.

Since the advent of the internal combustion engine, tracking has become almost a lost art, and its early significance will soon be forgotten. Crews of men fought their way grimly along the shores through overhanging brush, knee-deep in mud, or waist-deep in water. The ceaseless torture of myriads of flies, and the heavy work which only the strongest could long endure, made tracking one of the most brutal forms of labour. Nevertheless, such was the spirit of the men, that on nearing the end of the run at Athabasca Landing, gala attire replaced tattered overalls,



The tracker.



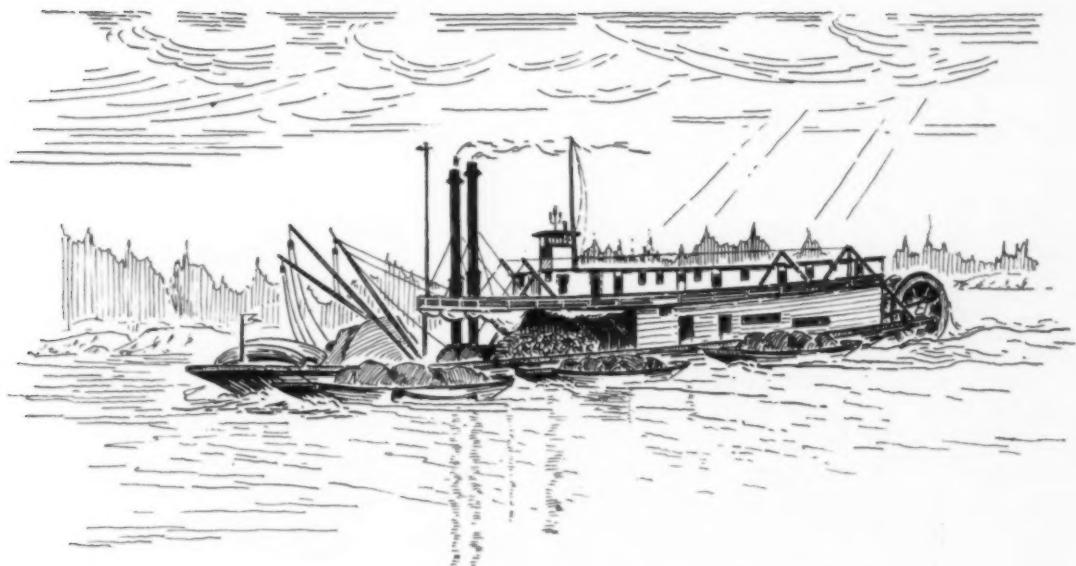
The bowsman.



Freighting on the old trail from Fort Edmonton to Athabasca Landing.

Scow building at Athabasca Landing.





Stern-wheel steamer with scows on the Upper River.

efforts were redoubled, and, not infrequently, on the last day, crews struggled along through the darkness for hours. On arrival, a single night's celebration often exhausted a month's wages, and the celebrants then faced the long trip back to the starting point on foot through the brush at their own expense, and depending for food on such rabbits as they could snare.

The strength of the tracking crew varied with the size of the scow and weight of cargo. At the fast and heavy water at Grand Rapids, all southbound freight was portaged along the east shore, and only with the greatest difficulty were the scows themselves tracked up-stream. Consequently, when northbound and southbound scows chanced to meet at this point, it was customary to exchange boats and merely transfer the cargoes. The time required to track from McMurray to Athabaska varied from fifteen to twenty-three days. As no tracking trail could be maintained along the shore, it was customary for boats to cross and recross the river at recognized 'crossings' in order to take advantage of the most favourable footing. Even so, it was impossible to avoid long stretches of almost incredibly difficult tracking.

One of the many stirring episodes which marked the closing years of transportation on the Upper River occurred in 1914. That year saw the commencement of construction of the Alberta and Great Waterways Railway, and Colonel J. K. Cornwall determined to run one of his stout stern-wheel steamers down river from Grand Rapids to McMurray. This steamer was 138 feet in length, had a cargo capacity of 80 tons, and a freeboard of possibly 3 feet. At stages of high water, Grand Rapids runs not less than fifteen miles per hour, and is a maelstrom of flying spray and crashing rollers. The channel is studded with great boulders. Neither captain nor marine engineer could be had, but it was necessary to take advantage of the high water which had reached its crest. Quickly a scratch crew of native 'boys', who knew no fear, was organized, an intrepid pilot, Joe Bird by name, climbed to the lofty wheel-house, and Cornwall himself took command. The forepart of the steamer's upper works had been sheathed with plank in order to shear the heavy seas. Finally, the mooring ropes were cast off from the river bank, the whistle cord tied down, and the heavy current swept the vessel from the river bank. But Cornwall's luck stood by him.

With spray dashing against the lurching wheel-house, thirty feet above the water, and the reckless crew screaming exultation and defiance, a steamer actually ran Grand Rapids for the first, and probably, the last time. Finally, in 1915, pilots and crews made their final bow; the curtain fell on the final act of scow transport on the Athabaska.

Progress, as represented by speed and comfort, has spanned and conquered the northern latitudes; tracking lines are coiled, and paddles are to a large extent stowed. In place of hundreds of hardy *voyageurs* and boatmen — individuals all, who took an intense pride in themselves, in their strength, skill, and daring — a handful of men now lean against polished steering wheels. The North has exchanged an unrivalled race of sturdy men for a few tons of engines.

Comfort and speed have superseded hardship and delay. But the cost of this apparent advance has yet to be computed. Like Aladdin, we have unloosed potent and portentous genii. Until recent years, these genii have served the human race well. To-day, however, from above the land, on the land, and from below the sea they threaten its very existence. The question arises: "What will be the ultimate cost of our so-called 'progress' in transportation?"

At the present time, mineral deposits constitute the powerful loadstone which is drawing men northward. To the discovery of these deposits must be attributed the rapid development of transportation facilities throughout the Athabaska-Mackenzie basin.

As an ultimate result of this development, however, the writer ventures an opinion; it is that, in years to come, Canada's middle North, and possibly her Far North, will rank among the world's great recreation grounds. Yet, few will

then pause to remember those indomitable and intrepid men who first led the way northward across the lonely La Loche portage, or down the turbulent Athabaska River. Yet, these were the men who laid the first foundations of our present transportation system in the Athabaska-Mackenzie basin; these the men to whom reference is made in the following lines:

"Drip, drip and patter, patter, and its chill in the early morn,

The tracking line grows heavy,—while men trudge wearily on,—

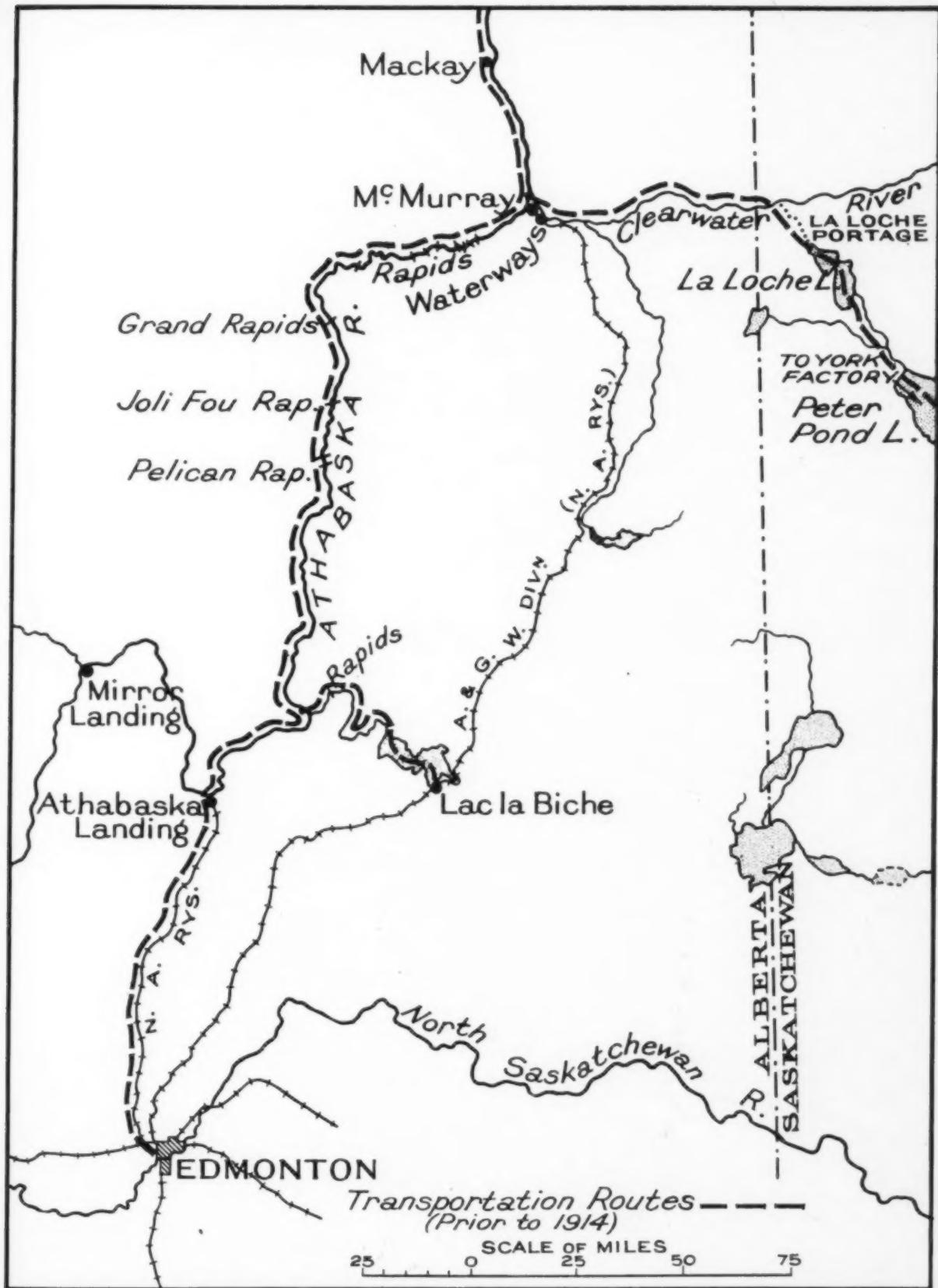
Wet with the dew at night and morn,—but with sweat in the noonday sun,—

Oh! there's rest, — and warmth, — and shelter,—when the last day's work is done!"

NOTE:—Fort McMurray was established by Factor Henry John Moberly in May, 1870. The post was named after Chief Factor Wm. McMurray, an old friend of Moberly, and at that time in charge of the Isle à la Crosse district. Moberly remained in charge until 1878, and was succeeded by Isaac Cowie. The name Fort McMurray was shortened to McMurray on February 16, 1910. As late as that date, the settlement consisted of half a dozen small log buildings, supplemented by Indian teepees during the summer months, while the country toward the south was known only to occasional trappers. Fort McKay was established in 1898 and named after Dr. Wm. McKay, who at that time was in charge of the district. During the period 1899-1912, McMurray was, in effect, an outpost of McKay. Prior to 1928, a post known as Berens House had stood at or near the site afterwards occupied by Fort McKay. Between 1778 and 1825, a number of minor posts — including Red River Post of the North West Company — were opened and closed along the section of Athabaska River between McMurray and Chipewyan.

(9) Construction of the Alberta and Great Waterways Railway, now a division of the Northern Alberta Railway, was commenced early in 1914, grading and track laying being completed to Cache 23 (near the junction of Clearwater and Christina rivers) in March 1916. In March 1921, the line was completed to Old Waterways (3 1/4 miles from the present terminus), and by April 1926, had been extended to the present terminus at Waterways. As construction progressed, freight was accepted by the railway company for the "end of steel".

ATHABASKA TRAIL





SALVATION OF OUR BEAVER

by ALBERT MUNDAY

Photographs Courtesy National Parks Bureau.

WHILE the beaver is known and acclaimed around the world as a national emblem of Canada — truly symbolic of the industry and perseverance which have developed our Dominion from a vast and trackless wilderness to a modern, front-line nation — few persons are aware that only recently the beaver, in most parts of their original range, escaped the fate of the buffalo, the silver fox, and the Red Indian. It was indeed "touch and go". The beaver was fast going the Jeremiad way of the reptilian dinosaurs, and other prehistoric monsters; within a few years to be known only in story and museum, and like the dinosaurs by their buried bones and the footprints they left in mud-flats that in ages turn to slabs of stone.

Had the old conditions continued, Canada, the land of the beaver in song and story, would have been required to select a substitute for a national emblem. Milady, the cynosure of the fashion world, royalty included, would have been required to resort to other furs of less queenly favour than the beaver for warmth and ornamentation. And — perhaps this is the most important — Canada would have soon lost one of its glorious associations with history; one of the real reasons for being discovered, explored, and developed because of the fact that for Canada the beaver was the *raison d'être*.

It will be recalled that one of the leading motives and greatest incentives in the early exploration of our Dominion was the profit to be derived from the fur trade, and particularly from the trade in beaver. History tells us of the thrilling adventures of the two intrepid Frenchmen, Pierre Esprit Radisson and Médard Chouart des Groseilliers, the latter known throughout an age and in records as "Mr. Gooseberry", who arrived at the place that is now Rupert's House, James Bay, in 1668, and after staying a winter trapping beaver and securing a large number of pelts from the Indians, returned to London, England, with a capacity load of skins. Because of their great success in securing beaver and the potential profits the great and honourable Hudson's Bay Company was formed.

Ever since those days of "gentlemen adventurers", up to a few years ago, beaver was plentiful from coast to coast in Canada. Everywhere in the Dominion where birch, willow or aspen trees grew,

and where water abounded, beaver thrived and flourished. For more than two centuries beaver was not only the principal article of trade in Canada, but also it was the medium of exchange and the standard of value throughout the North American continent.

It would be interesting to have statistics on the number of beaver caught since those early years of Radisson and Mr. Gooseberry. The figures would be staggering — unbelievable, well into the hundreds of millions. It is difficult to hazard even a rough estimate when one takes into account the hundreds of trading posts, the countless number of free and independent traders as well as the four major companies. A slight indication can be accepted from the beaver caught at Rupert's House, a post that has been in active corporation since 1668, a total of 270 years, and up to a few years ago this post alone had been securing on an average 800 pelts a year. Record years went well over the 1,000 mark, while a catch of 600 was classed as a "depression" year. This gives a total of 216,000 beaver. Multiply this by 600 posts of four major corporations, plus thousands of independent trappers, white and yellow as well as Indian. The aggregate is unbelievable. No wonder the beaver gave up!

And so the day came when Indians and traders awoke to the fact that in the rich beaver territories, especially in the James Bay district, beaver had almost disappeared. It looked like the last of the Hudson's Bay Company and also the winding up of the other major companies because of slim years in beaver catch. The situation was serious in many ways. Thousands of Indians from coast to coast in Canada would be faced with starvation, no beaver pelts to sell and no beaver meat to eat . . . the various governments would be required to give relief to these Indians. . . taxpayers would be faced with higher taxes and our national debt would soar to even higher figures.

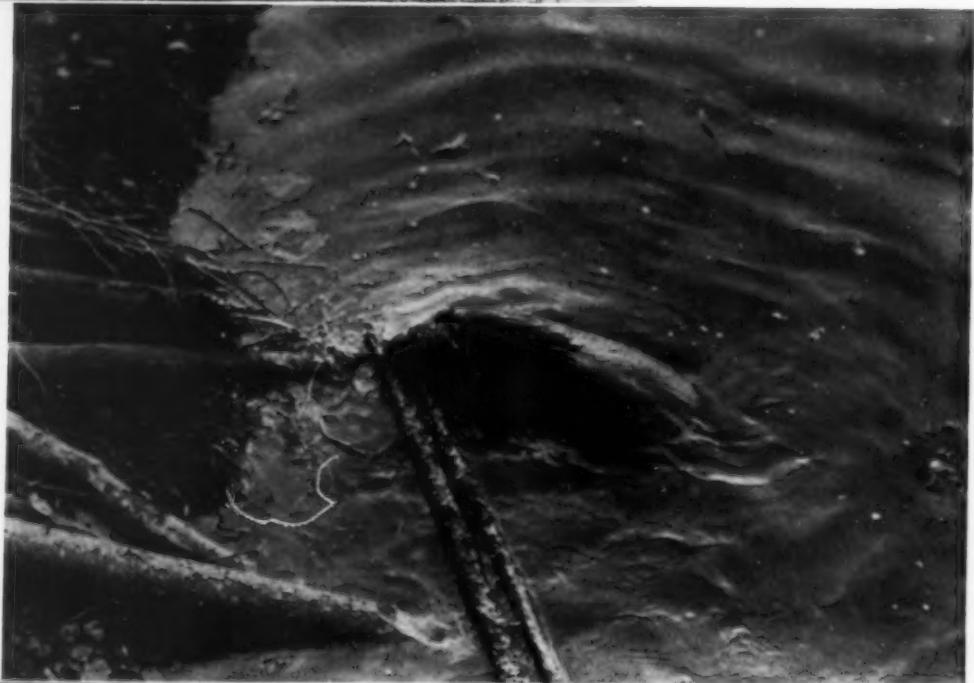
Mr. R. S. Watt, Hudson's Bay factor at Rupert's House at the present time and one of the outstanding authorities on beaver, sums it up briefly but excellently: "If the Hudson's Bay Company had been an ordinary business concern the fiddles and drums would have played 'Bundle and Go'. The various posts throughout the North

Upper left:—Beaver carry large quantities of green branches and twigs and pile them up in deep water. The weight keeps the bulk of the pile under water, providing food for winter under the ice. Feed raft.

Lower left:—Two young beaver feeding at edge of feed raft.



Feed raft. Grey Owl claimed this to be one of the largest and best rafts he ever saw. Prince Albert National Park.



Beaver pushing tree branch into place while making a dam.



Edge of uncompleted beaver dam. Added weight of branches, twigs, mud and muck will push the free ends under water.

and North-west would be closed and 'finis' would have been written to the story of the beaver. But in the dark days of depression the authorities took stock of their resources and considered them from all angles, then declared a 'new deal', a long term of beaver conservation on entirely new lines, with Indians to be trained as beaver guardians."

It meant the dawning of a new day for the Indian, a day of new hopes and new interests. The conservation of the beaver had always been of great importance to the Indian, even from the early days of Canada. The Indian always appreciated the economic factor that beaver was his capital and in order to provide for his present needs, and the future needs for himself and his family, and his children's children, he *must* conserve his capital and live off the interest. The extermination of the buffalo had been a lasting lesson to his forebears and he was going to benefit from that lesson. With rabbits, partridge, ducks and fish plentiful he was assured of food, and with marten, fox, and other migratory fur-bearing animals he was able to trade sufficient pelts for a supply of tea, sugar, tobacco, ammunition, and other necessities. When migratory animals were scarce, and food was not abundant, he would be required to resort to beaver, but would kill *only* sufficient for his urgent and day to day requirements.

In those days the Indians formally maintained a right to their respective hunting grounds and in this way had an excellent incentive to farm the beaver. And while the Hudson's Bay Company was the great power in the Indian country these rights were maintained as far as possible. It was to the company's benefit to make the Indians self-sufficient, law-abiding, and far-seeing subjects. Only in this way could the company be assured of staple patronage that was, and still is, the life-blood of the corporation.

But the time came when irresponsible, nomadically inclined tribes, outcasts of the Indian race, began to poach on hunting grounds sacred to other tribes. Countless tribal wars resulted but gradually the rights to the Indian lands became insecure and during the past two decades these hunting rights have practically lapsed entirely. With the gradual lapsing the Indians lost interest in conservation of the beaver and to a great extent they cannot be blamed. Protests of law-abiding Indians against encroachment on their hunting rights met with little support by reason of the fact that no legal title could be given to the lands. So why carry on with peaceful conservation of the beaver?

Trap and trap while the trapping is good — let the government worry about the outcome. Why try to save a few beaver lodges for next year when a next door neighbour can come along and kill off the beaver? I remember one Indian telling me that he saved several beaver lodges for three years, protecting them for his own use and the use of his family and then along came his own brother-in-law and killed all the beaver and he was powerless to stop him.

But all that is past. With the imminent practical extinction of the beaver, action has been taken and according to present plans the beaver will once again be counted in the thousands and perhaps within a few years in the millions. The Indian will have his beaver meat, which is just as precious to him as is roast beef to the Englishman. The Indian will be able to trap his quota of beaver and sell the hides at the same high prices as in the past. New hopes and interests indeed. To-day posters giving the estimated increase each year, and the number that may be killed in each area, are placed in conspicuous places in Indian country, and the Indians take as much interest in these charts as do people in stock market reports.

To-day Canada can boast of the largest beaver sanctuary in the world, and the Dominion take the great credit for laying solid foundations for new national industry — beaver farming. From present indications thousands of Canadians will, within the next few years, organize and operate beaver farms or sanctuaries; reaping big profits from an occupation that will be as interesting as it is profitable.

This largest beaver sanctuary in the world is at Rupert's House, James Bay, the historic site of the first Hudson's Bay Post, established in 1668. This site of seven thousand square miles, leased from the Quebec Government, is an area of heavily wooded land abundant with fresh-water springs, and is proving a real and natural home for the beaver. Already they are increasing in number beyond the most hopeful expectations of those who brought about this new move to restore the beaver in Canada. The boundaries of the preserve are well defined on three sides and thus can be protected easily against unlawful trapping. On the west the preserve is protected by the shore line of James Bay, the northern limit being the Eastmain River and the southern limit being the Rupert River. On the south the Rupert River serves as an excellent boundary line for a distance of approximately 140 miles inland; while on the north the Eastmain River defines the limits of the

sanctuary for a similar distance inland. On the east, or up-country side, the 76th meridian is used as a boundary line running from north to south, from the Eastmain River to Rupert River.

Rupert's House sanctuary is such a great success to date that other similar measures have already been announced. Recently the Federal Government leased from the Quebec Government an area of 1,300 square miles, immediately south of Rupert's House sanctuary. This area has already been declared a beaver sanctuary—a sanctuary for the exclusive use of Indians. All trapping, even by the Indians, is forbidden for a period of 15 years. After this period of time has elapsed the Indians are to be given exclusive trapping privileges.

While the Rupert's House sanctuary was only recently announced as being in effect a sanctuary it was started in a small way in 1935. In fact it was a few years before that year when only 20 pairs of beaver were kept within a confine as an experiment. In 1935 the total number of beaver was 254 pairs, which had grown from the 20 pairs. By 1938 the total number of beaver had grown to 3,296, which shows an increase of 1,590 from a number of pairs of 1,706. When it is borne in mind that beaver breed only every two years the figures show an excellent increase.

The actual figures showing the increase to date and the predicted possibilities are interesting in the following chart:

Year	Pairs	Increase
1935	254	146
1936	530	552
1937	911	762
1938	1,706	1,590
1939	3,072	2,733
1940	5,631	5,118
1941	10,239	9,216
1942	13,370	11,262

In 1942 it is estimated that a total of 5,000 beaver can be killed. This would leave the increase at 6,262. In the following year 10,000 beaver can be killed, leaving the increase at 5,478. In 1944 an additional 10,000 can be killed, leaving the increase at 6,740. By the following year 1945, killing 15,000 beaver, the increase would be 7,218.

These figures take into consideration only one sanctuary. To-day Charlton Island, James Bay, is also a beaver sanctuary and the island of Akimiski, also in James Bay, has been restocked from the Rupert's House preserve. A report from Saskatchewan is to the effect that the Government is giving serious consideration to the establishment of three beaver

sanctuaries, to be organized and operated along the same lines as those at Rupert's House, Charlton Island and Akimiski Island. In all probability several pairs of beaver for these new sanctuaries will be secured from the preserves in James Bay.

The beaver for restocking purposes are not trapped, but taken from their lodges alive in April and kept at the various beaver farms until it is possible to transport them in June. This activity is not without its serious as well as humorous incidents. At Rupert's House the beaver for transport were once kept in a wooded shed in which several wooden tanks had been installed, but the beaver made considerable trouble. They chewed their way out of the tanks, then out of the shed, in the meantime doing much damage to the buildings. At that time Mrs. Maud Watt took a particular liking to a baby beaver born in captivity and decided to make a pet of it. She kept it in her kitchen, taught it to sit up and beg, and within a few weeks it was part and parcel of the household, until the day the youngster "found" its teeth. Unfortunately the infant found its teeth during the small hours of the morning, a time in keeping with the daily work of the beaver. That next morning when Mrs. Watt came downstairs she was positive there had been an earthquake. All the chairs were at an angle, the table had a lean to starboard, and all other pieces of furniture in sight were on their sides or ends. The baby beaver had spent the entire night in chewing the legs of the chairs, the table, and other pieces of furniture. That next afternoon the pet was shipped along with several others in a boat to Akimiski Island, but the pet escaped from the crate and was not discovered until water started to flood the boat. It was then found that the pet had chewed its way into the bottom of the boat. The boat was put full speed ahead to the nearest island and in this way the lives of the men on board were saved.

It is too early at this date to predict the success of the beaver conservation plan, or to estimate the advantage to the Dominion but from present indications the success will be *sure* from a natural conservation angle. With the present closed season enforced for a few more years, with a careful watch kept on our wild lands so as to enforce our game laws, and with the steady and prosperous increase in beaver from coast to coast in Canada there is every possibility that Canada will prosper in dollars and cents in many ways from this latest of schemes to preserve our natural game, and especially the beaver — one of the best-known national emblems of our Dominion.

Beaver gnawing on a fallen tree branch. The favourite food of beaver is bark of several species of poplar, birch and willow.

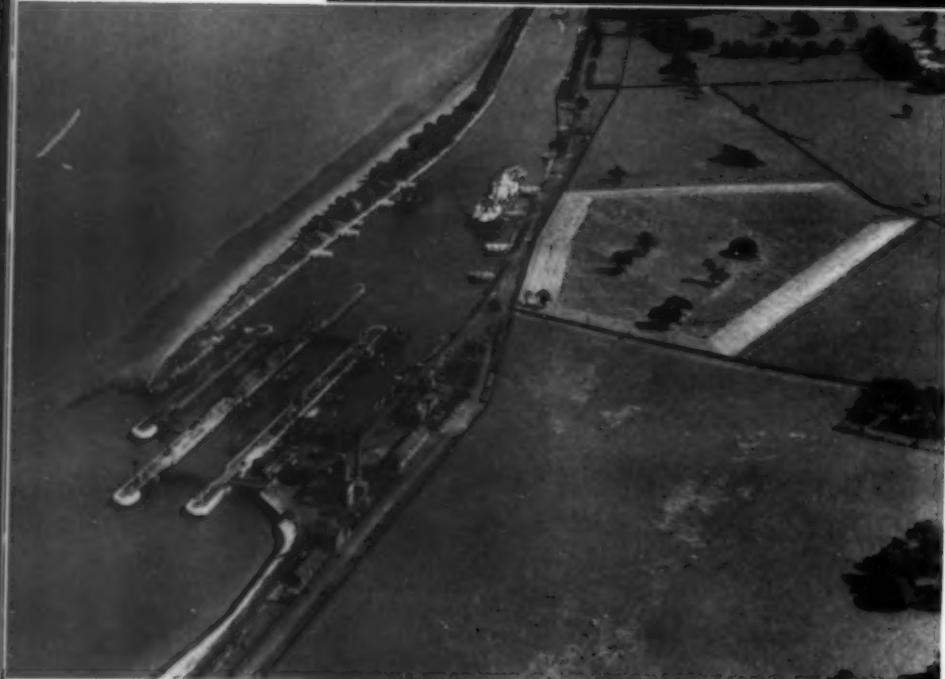


Beaver carrying mud to plaster a dam.

The beaver walks slowly and awkwardly but often drags logs and branches some distance to the water. If the ground is damp or swampy the beaver will sometimes open up lateral canals for transportation of wood to lake or stream.



No. 9 Dock, Manchester.



Eastham Locks —
Entrance to Man-
chester Ship Canal.

New Barns Railway
Junction.

An aerial view of New Barns railway junction, Manchester, showing No. 9 Dock on the left and No. 8 Dock on the right. At noon and 5 p.m. each day the full waggons are removed from the ships' sides and replaced by empty waggons, or in the case of ship taking on a cargo the reverse operation. Full waggons are brought to the railway junction where they are marshalled for their different destinations and handed over to the railway companies concerned. There are many points on the Ship Canal where this operation takes place.



MANCHESTER — HEART OF INDUSTRIAL ENGLAND

by H. BAKER

MANCHESTER was a prosperous manufacturing town long before it attained anything like its present reputation for commercial and industrial enterprise. John Leyland, the antiquary, in 1538 described Manchester as "the fairest, best builded, quikkest and most populous tounne of all Lancashire"; and ever since it was a Roman fort it has been a conspicuous centre of activity.

To go back even further than the year 1538, historical records reveal that the Celts established a fort called Mencerion about the year 38 B.C. The name was changed to Mancunium when it fell into the hands of the Romans in A.D. 78.

The cotton industry, for which Manchester is famous throughout the world, was added to the town's activity about the year 1500. Some 140 years before this—in 1363—Flemish weavers were introduced by permission of Edward III, and their activities undoubtedly brought a certain amount of prosperity to the people of Manchester.

The coming of the cotton industry to Manchester in 1500 increased the size and importance of the district, and the opening of the Manchester and Liverpool Railway in 1830—the first railway for freight and passengers—greatly facilitated trade. Another important enterprise, which contributed very largely to the prosperity and resources of the city, was the construction of the Manchester Ship Canal. Until 44 years ago, Manchester was dependent on roads and railways which linked her to the coastal ports for access to the outside world. The city itself stood beside a shallow river—the Irwell—which was useless for the navigation of craft drawing more than a few feet of water.

Manchester has always been in the van of commercial and industrial enterprise since the beginning of the factory system and the use of steam power. There came a time, however, towards the end of the last century, when the city's trade slumped to such a degree that serious alarm was felt amongst the industrialists, who feared that a sickness was sapping its strength, from which it might not recover. It was realized that Manchester's commercial prosperity was in peril. The Manchester Chamber of Commerce, backed by the most powerful and influential business interests in the city, expressed the opinion

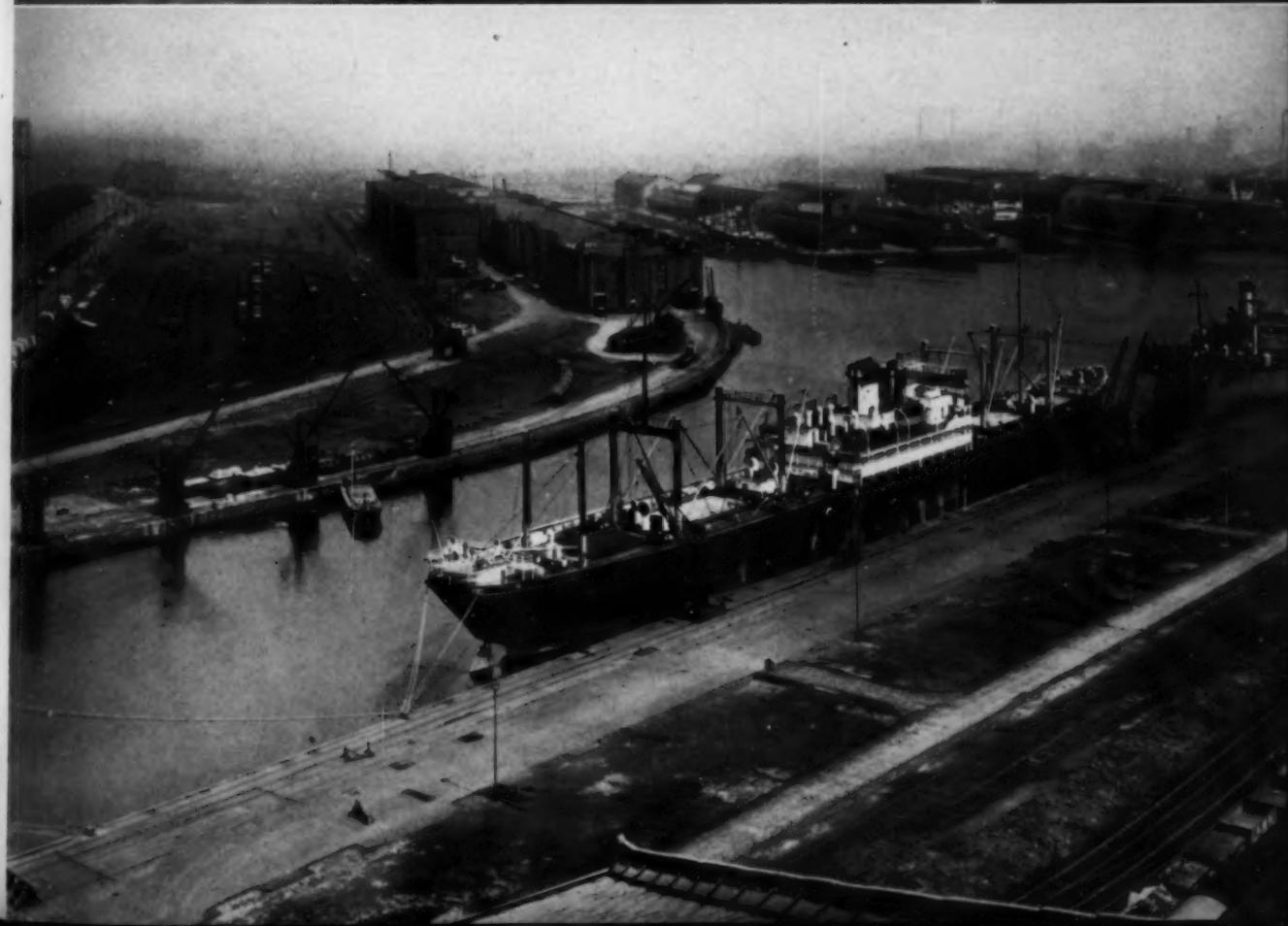
that a water-way capable of bringing ocean-going vessels up to Manchester, was absolutely necessary.

It has already been stated that Manchester is famous for its textile goods. Manchester is, indeed, the centre of the cotton textile industry, the largest single export trade in the British Isles. But within the area are many other activities, several of which are of such size and importance as would raise them in any other centre to the dignity of staple industries. Manchester can also claim to be a centre of the United Kingdom's heavy and electrical engineering industries and of the chemical industry. Manchester, or rather Lancashire, of which Manchester is the hub, has been referred to as the workshop of the world. This is no idle boast—motor vehicles; glass; oil, glue and soap; wire netting and ropes; ship-building; grain-milling; tanning; paper-making; wall-paper; rubber goods; oilcloth and linoleum, are other industries of which Manchester and Lancashire are justly proud, and in which a large proportion of her workers are engaged. Official analysis reveals that this area finds work for about one-third of the United Kingdom's workers. Manchester is the heart of a district maintaining 14,000,000 people. Therefore, it will not be difficult to appreciate the value of the city and the district immediately surrounding it as a consuming centre for goods of virtually every kind.

The cotton textile industry has in recent years passed through conditions of great difficulty. The general decline of purchasing power throughout the world, coupled with intensified competition in overseas markets, made possible by cheap eastern labour and the development of highly protected cotton industries in countries which formerly were large buyers of United Kingdom cotton goods, have been contributory factors to this state of affairs. As previously mentioned, the cotton industry in Manchester dates back to the sixteenth century, but growth was more rapid after 1750 and received its greatest impetus with the introduction of steam power in the early nineteenth century. Among the major reasons why this great industry was established in Lancashire, was the natural humidity of the atmosphere, the adaptability of the people and the suitability of the water supply for the

Title for pages 348 and 349: Top:—Stanlow Oil Docks. Bottom:—Panorama—Manchester Docks.





necessary finishing processes. To give an impression of the enormous productive capacity of the cotton industry, it is only necessary to state that in 1935, 2,013 million yards of cotton cloth were exported throughout the world, and estimated consumption in the home market was 1,036 millions. Thus the total was sufficient to girdle the world sixty-nine times. In other words, enough cotton cloth was woven in Lancashire in that year to provide each individual in the universe with one-and-a-half yards each. It is interesting to record that of this quantity, approximately sixty million yards were consigned to Canada.

A complementary branch of the cotton textile industry centred in Manchester is the manufacture of rayon goods. This younger addition to the family is making steady headway and proving a valuable contribution to the industrial activity of the district.

A number of industries in which Manchester is interested, other than textiles, have already been enumerated. To visualize the diversity of industrial activity, it should be realized that in Manchester and the surrounding towns there are almost 18,000 factories and 8,000 workshops not concerned with textile manufacture. This large number is being added to constantly. In 1936, no fewer than 116 new factories were opened and in 1937 another 120 were established.

Adjoining the Manchester docks is the industrial estate of Trafford Park, famous

for the amazing concentration of industry which has taken place there. A generation ago this place was a quiet country estate where deer roamed. To-day it is the home of 200 firms employing 40,000 work-people, and for its size it is probably the busiest industrial area in the world. Adjacent to Trafford Park is a further area of 1,000 acres designed for industrial development. Already a world-famous firm of cereal food manufacturers has erected a million pound factory there. The firm came to Manchester after a nation-wide search for a site and the reasons given for the final choice, namely, convenience for import and export traffic, the facilities for distribution, and the abundant supply of power and labour, are characteristic of those advanced by undertakings settling in Manchester. It is significant that this particular firm intends to serve not only the English market but the whole of the European market from its Manchester factory, and emphasizes the claims made earlier that Manchester is an ideal distributing centre second to none in its appeal to industrialists.

In addition to these two large industrial estates, there is still another area within the city boundary which is planned for industrial development, more particularly for lighter industries. This is provided by the municipal authorities in the satellite town of Wythenshawe. Industries established here are in the midst of rural scenery.

Manchester has been an eminent commercial centre for well over a hundred



Corporation Housing Estate in Manchester's satellite town of Wythenshawe.

years. It may be because its cotton industry has been largely an export trade that it has had this prominent position thrust upon it. The Manchester Royal Exchange is the largest market place in the world for the buying and selling of cotton goods. "High Change" on Tuesdays and Fridays is one of the sights which greatly impresses visitors to Manchester. The "floor" of the Exchange accommodates from twelve to thirteen thousand members, and it needs but little imagination to picture the densely packed crowd of business men buying and selling textiles under one roof.

Other Exchanges in Manchester which provide similar facilities for other commercial enterprises are the Corn Exchange, the Grocery and Produce Exchange and the Coal Exchange. Each of these is a hive of activity in its own particular field.

Banking and insurance are also well represented within the City of Manchester. Manchester is the undisputed leader of the whole country outside London in the financial sphere. The total of Manchester's bank clearings over a number of years have approximately equalled those of the next three largest provincial centres added together. The local banks, coupled with many important branches of the "Big Five" banking organizations and the presence of a branch of the Bank of England, have brought Manchester to the high pitch of efficiency which it enjoys to-day.

Brief reference has already been made to that wonderful achievement—the Man-

chester Ship Canal, of the story of which every Mancunian is proud.

The possibility of making a navigable water-way between Manchester and the sea had been talked about for many years before concrete steps were taken. One of the earliest schemes was for a canal from the estuary of the River Dee. In 1882 a movement was instituted for bringing the sea to Manchester, by calling a meeting of members of local authorities and leading business men. This meeting, now historic, had before it a new proposal, this time in connection with the River Mersey. Two schemes were reviewed; one for a tidal water-way, the other for a canal with locks. The former was rejected as its result would have been a dock system lying 60 feet below land level, and it was wisely thought better to raise the incoming ships, by means of locks, to Manchester's level.

The scheme originally contemplated was a dredged channel, maintained by training walls on the north side of the Mersey from Garston to Runcorn where the river narrows, thence canalization to Latchford, near Warrington, some twenty miles from Manchester, where the first lock was to be: the canalization of the Mersey and the Irwell up to Manchester with a second and third lock. To this there was much opposition born of anxiety lest the training walls should interfere with the scour of the tides, relied upon to combat the silting in the estuary, and jealousy where vested interests were threat-



In a Manchester park.



1

1. No. 9 Dock, Manchester.
2. Printing cotton cloth at one of the works of The Calico Printers' Association, Ltd.
3. Asbestos water and gas pipes —Turner Bros. Asbestos Co., Ltd.



2



3





4



5



7

6



8



4. Assembling motor chassis — Leyland Motors Ltd.
5. Tar acid distillation plant.
6. Soap stamping.
7. Assembling electrical apparatus — Metropolitan Vickers Ltd.
8. Weaving cotton cloth.

ened or were thought to be. The fight for parliamentary powers and the modification the plans underwent during the struggle is too long and too complicated to be entered upon here. It is enough to say that with the tenacity with which Manchester is not unjustly credited, she persevered and received the Royal Assent to a third and final Bill on August 6th, 1885. The contract was let in June, 1887, and the first sod was cut at Eastham in November of the same year.

As soon as the legal difficulties were overcome there were other troubles to face arising out of the twin problems of construction and finance. Penny by penny the money was raised by the citizens of Manchester and twice did the Manchester Corporation come to the assistance of the project, lending first £3,000,000 and later £2,000,000. Floods and landslides undid the labour of months and wrecked valuable machinery; and engineering difficulties sprang up like dragon's teeth. In all, some 16,000 men were engaged on the undertaking; the total excavation amounted to 76 million tons of earth, one-fifth of which was solid sandstone; 223 miles of temporary railway track were laid. The canal was completed in six years at a cost of roundly £15 millions. It was opened to traffic on January 1st, 1894, when 71 vessels entered the locks at Eastham and on the following May 21st it was officially opened by Queen Victoria.

So much for the history of the undertaking which turned Manchester, an in-

land city, into a world port and one of the leading ports in Great Britain. The Manchester Ship Canal comprises a water-way 35½ miles long, from 28 to 30 feet deep and 120 feet wide at the bottom, which is regularly navigated by ocean-going freight steamer up to 15,000 tons d.w. capacity. The dock estate covers an area of 406½ acres, including a water space of 120 acres, and quays total over 5½ miles in length. The quay and storage area is 286½ acres in extent, and the latter comprises fine transit sheds and warehouses which range the dock sides. For cold storage there is a chamber of 300,000 cubic feet besides cold storage premises managed by the Corporation of Manchester and private firms, having a capacity of over 3,000,000 cubic feet. Each of the two grain elevators have a storage capacity of 40,000 tons and the more up-to-date of the two can receive grain from six vessels at once at the rate of 900 tons per hour. Batteries of powerful cranes and hoists flank every dock and quay and all ships' berths have direct connection with main roads, trunk railways and inland water-ways serving the entire country.

The Port of Manchester looks to the west—towards Canada—and it is with the West that she has established some of her most important and valuable trading relationships. The Manchester Liners, for instance, which for nearly 40 years have maintained regular weekly services across the Atlantic, are as familiar in the St. Lawrence as they are in the Ship Canal.

Manchester is the larder of the north and midlands of England. All members of the great industrial family look to it for food. The rich lands of the western world provide foodstuffs and raw materials consumed within this densely populated zone of the port of Manchester and in return the workshops of Northern England send manufactured goods across the Atlantic. Between Manchester and Canada ships ceaselessly pass to and fro with many rich and varied cargoes. Regular weekly freight services between Manchester and Canada have been maintained since 1898. The trade between the Dominions and the Mother Country continues to expand rapidly. There is room for still greater expansion and it behoves all whose interests are bound up with commerce and industry to strive to that end.



Central Library (left) and Town Hall Extension (right).



Piccadilly.



Hedley's soap factory from the bank of Manchester Ship Canal.



Lloyds Packing Warehouses—case making for the export of cotton goods.



Discharging raw cotton at Manchester Docks.

Turning basin — Manchester Docks.





Railway operations at Trafford Wharf.

250-ton crane at Manchester Docks.



EDITOR'S NOTE-BOOK

Charles Camsell, B.A., LL.D., C.M.G. Deputy Minister of the Department of Mines and Resources and Commissioner of the Northwest Territories, who contributes "The Yellowknife Mining District" appearing in this issue, has been the President of The Canadian Geographical Society since its inception in 1929. Born at Fort Liard in the Northwest Territories, Dr. Camsell received his education from Manitoba University, Queen's University, Harvard and the Massachusetts Institute of Technology. In 1922 The Royal Geographical Society awarded him the Murchison grant for his work in geological investigation and exploration through the Canadian Northwest over a period of 25 years, and in 1931, he was awarded the Gold Medal of the Institution of Mining and Metallurgy.

S. C. Ells who wrote "Athabasca Trail" has been associated with engineering and geological work in many parts of Northern Canada for more than thirty years. Mr. Ells' investigations of the bituminous sands of Alberta have brought him recognition as the international authority on these deposits. For some years Mr. Ells has been attempting to interpret the spirit of the Canadian northland through both prose and verse. His recent book "Northland Trails" was reviewed in the December 1938 issue of the Journal.

A. H. Munday, B.A., Ph.D., was born in Melbourne, Australia, received his early schooling in England and continued his studies at the University of Toronto, Queen's University, Columbia University and McKinley-Roosevelt University of Chicago. A newspaperman for several years, he is the author of a number of books, both fiction and technical, and has made seven trips to the West Indies and South America in geographical interests. Dr. Munday was the co-founder of the Toronto Flying Club and founder of the Model Aircraft League of Canada.

H. Baker, as Secretary of the Manchester Development Committee and Sectional Secretary of Dominion Markets, Manchester Chamber of Commerce, is well-qualified to contribute the article "Manchester—Heart of Industrial England" which appears in this issue.

AMONGST THE NEW BOOKS

The Pathfinders of North America, by EDWIN and MARY GUILLET (Toronto, Macmillan in Canada, 1939, \$1.50). This is a fascinating book. Its silvery binding set off with a design in red and blue from J. D. Kelly's "John and Sebastian Cabot Landing at Cape Breton", gives promise of many delights to boys and girls fortunate enough to read it. Here, in 304 beautifully-printed pages, we have the whole story of the exploration of North America from the coming of the Norse Sea-Rovers to the Discovery of the North Pole. You march through Central America with Spanish soldiers, roam the forests with French *courreurs-de-bois*, sail unknown seas with the old heroes, Cortés, Ponce de Leon, Coronado, the Cabots, Cartier, Champlain, Gaspar Corte-Real and many others whose exploits are not so well known.

The authors frequently quote from the travellers' own descriptions of the marvels that met their eyes in this new land. Cartier tells of discovering "a goodly Myne of the best yron in the world", and one day the Indians led him to a place where he found great rocks of quartz and pyrites which shone in the sunlight like gold and silver. He described also "certain leaves of fine gold as thick as a man's nayle, veins of mynerall matter which show like silver and gold and stones like Diamants the most faire, polished and excellently cut that it is possible for a man to see".

It would be difficult to find in one book a more remarkable collection of historical pictures from so great a variety of sources. Many of the 73 illustrations were drawn by the explorers themselves. Others are famous paintings and sketches by artists who made careful study of the times and regions which they depict. Arthur Heming's gorgeous painting, "Sir Alexander Mackenzie crossing the Rockies, 1793", forms the frontispiece; and there are excellent reproductions of pictures by C. W. Jeffreys, Charles Comfort, Paul Kane, W. J. Phillips, Sir Thomas Lawrence and others.

The end-paper maps are of Southern North America and Northern North America, respectively; and are sprinkled with the names of explorers and adventurers of the "New Lands" making it easy to trace their course and orient their discoveries.

Older people have cause to envy the youngsters of to-day to whom history and geography are presented with so much interest and glamour. This book will delight them also, and will be a special boon to teachers. Other works by Mr. Guillet are: "Early Life in Upper Canada, Toronto from Trading Port to Great City"; "The Great Migration, the Atlantic Crossing by Sailing Ship After 1770".

FLORENCE E. FORSEY.

Map of Britain in the Dark Ages, North Sheet, Scale 1:1,000,000. (Ordnance Survey, Southampton, England. Price — five shillings).

The Ordnance Survey of Great Britain has for some years made it a practice to publish historical or archaeological maps of Britain at various periods. This series has included maps of Roman Britain, Saxon Britain and various large scale maps of areas of particular archaeological interest. The last of this series to be published are two maps indicating the archaeological remains of Britain in the Dark

Ages. The southern sheet covering most of England and Wales and the southern part of Ireland was published three years ago and was followed in January last by the northern sheet.

This map on a scale of 1:1,000,000 is an example of the beautiful cartography for which the Ordnance Survey is famous. It is bound in a paper folder which also includes some forty pages of diagrams, name index and explanatory text. The various archaeological remains, in so far as they have been verified, of the period from 400 A. D. to the beginning of the ninth century are indicated in position by appropriate symbols and the names for topographical features are those of that time. Since the Scotland of that day was in a state of chaos, torn by faction and strife, there are relatively few of these remains and the written records are equally rare. For these reasons the present map will not have the same general interest as its companion sheet to the south, its appeal being rather to the scholar and historian.

These period maps of the Ordnance Survey have done much to recreate for us the ebb and flow of conquest, and the imprint made upon Britain's long history by the various racial stocks, Celtic, Roman, Saxon, Dane and Norman. They are an invaluable supplement to the history of the periods which they cover, and outstanding examples of the usefulness and adaptability of the specialized type of map.

The Discoveries of Antarctica within the American Sector, as Revealed by Maps and Documents, by WILLIAM HERBERT HOBBS. Transactions of the American Philosophical Society. (University of Pennsylvania Press, Philadelphia, Pa. \$2.50).

This volume of the Transactions of the American Philosophical Society is an account of the exploration of Antarctica within the American sector, the part lying immediately to the south of the American continents. It gives adequate reference to the various explorers and expeditions which have entered that area, but is largely taken up with a discussion of the explorations of one Captain Nathaniel B. Palmer of Stockbridge, Connecticut, who, the book avers, was the first to sight the Antarctic continent. This, it would appear, has been disputed and the discovery claimed for British navigators. The author brings a mass of evidence, in the shape of charts, logs and journals to the support of Captain Palmer's discovery, which would seem to place its authenticity beyond any shadow of a doubt.

To the general reader the question of who it was that first saw these bleak shores may not be a matter of more than passing interest. The story, however, of Captain Palmer, who at that time was under twenty-one years of age, and the sloop Hero, 47 feet long and registered at 44 tons, and their navigation of those stormy seas, is an epic in the long tale of polar exploration. This little vessel was sent to the South in 1820 as a scout and tender for a fleet of American sealers. Her crew of two officers and four men successfully navigated her to the Antarctic Circle and home again, explored and charted the South Shetlands and made the first land fall on the Antarctic continent on November 18, 1820.

The book is admirably documented and referenced, and contains many reproductions of charts and maps. It is a valuable addition to the bibliography of polar explorations and of more than

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ordinary interest as an account of an area in which, even to-day after the work of Wilkins and Ellsworth, relatively little is known.

P. E. PALMER.

The North American Assault on the Canadian Forest by A. R. M. LOWER. (The Ryerson Press, Toronto, \$3.50).

This book by Professor A. R. M. Lower of Wesley College, Winnipeg, is one of the series concerning "the relations of Canada and the United States" and has been prepared under direction of the Carnegie Endowment for International Peace, Division of Economics and History.

Professor Lower appears to have approached his subject with a broad background of knowledge of the trade relations and history of the two countries, as well as of the lumber industry itself. The book traces the history of the North American timber trade which, despite international boundaries, must to a large extent be considered as a whole, from its origin in the forests of New England and the Maritimes, through the St. Lawrence Watershed and the Great Lakes, to the Prairie Provinces and British Columbia. While the author is primarily engaged with the international aspects of his subject, he has managed as well to make a most valuable study of the whole lumber industry, which has been such an important factor in the economic life of Canada for the last century and a half. All of Professor Lower's readers may not agree with his conclusions on a protective tariff nor with his statement, page 87, that "for Canada war has been a relatively safe and at least temporarily advantageous condition". Apart, however, from any such expressions of the personal opinions of the author, the book is a valuable contribution to our understanding of the relations between the two English speaking nations of North America. It is pleasantly written, adequately referenced and indexed, and includes bibliographies of various phases of the subject.

Separate sections are included covering the Forest Industries of British Columbia by W. A. Carrothers, and Forest Industries in the Maritime Provinces by S. A. Saunders. These sections give a more detailed study of the lumber industry for those two parts of the country, where it has always been of such primary importance.

The book is recommended to every serious student of Canadian affairs, and should not be overlooked by any one desiring a better understanding of one of the most important features of Canada's trade and national economy.

P. E. PALMER.

Soviets in the Arctic by T. A. TARACUZIO, PH.D. (The MacMillan Company of Canada, Toronto, \$8.25.) The world is all staked out so that few countries can extend their boundaries without encroaching on territory claimed by another nation, yet, some powers are seeking territorial expansion, claiming need for room for their expanding population, or for areas possessing natural resources which they do not have within their own domains. To acquire these areas they must violate the boundaries of adjacent states, or cast covetous eyes on distant territories which they may violently expropriate. This desire for such territorial acquisition may only be an excuse for personal aggrandizement or prestige. Soviet Russia, apparently not seeking prestige or

distant colonies, is concentrating its territorial expansion in another way by extending its boundaries northwards into territory contiguous to its own domains, and not claimed by any other country. The U.S.S.R. have formally claimed all land lying within the sector immediately north of their mainland as far as the North Pole.

To spread out their population for effective occupation of this territory, the northern limits of land settlement are being pushed eastward and northward into the islands lying to the north. Intensive study is being made of the regions north of the Arctic Circle, and inducements are being held out to assist migration to these areas.

In his book, Dr. Taracuzio covers all the phases of this intensive study, dealing with it from its historical, political and economical aspect. He summarizes all that has been accomplished and outlines the comprehensive plans being made for the future of these vast Arctic regions.

The opening chapters are intended to supply the reader with the geographic background for the ensuing text. The Arctic regions are defined, their boundaries outlined and the physical features described. The succeeding chapters are devoted to a discussion of the explorations previous to 1917, and to the efforts of the Soviets since that date. It is pointed out that during the Tsarist regime most of this area was a huge penal colony, or was devoted to exploitation by Tsarist capitalists. After getting organized, the Soviets became aware of the immense possibilities of the domain north of the Arctic Circle, and on April 15th, 1926, laid formal claims to all lands already discovered, or those which might be discovered in the future within the sector lying north of their mainland as far as the North Pole and within certain meridional boundaries.

As this was a virgin field, this region lent itself for experimentation for the Soviet planned civilization, and an impetus was given to the eastward and northward trend of industry, and colonization was given special recognition. A chapter on economic problems shows that explorations of a geological nature indicated that enormous coal resources and metalliferous deposits lay in these regions, while other surveys showed that whale, fish, seal and walrus abounded in Arctic waters. Plans were then feverishly pushed forward to make certain of the feasibility of the North-east passage around Siberia, and settlements were made at strategic points along the northern mainland and up the great rivers emptying into the Arctic seas. Fuel from the coal fields made navigation possible, and ice-breakers now keep the passage open except in extraordinarily severe seasons. Aeroplane routes have been established and hydrological, biological and meteorological stations add to the vast fund of information needed to make possible the effective occupation of the Arctic.

The Soviet cultural reconstruction is revealed by enumerating a few of the accomplished facts outlined in the succeeding chapters of the volume. The natives have been educated, attaining about 25% literacy. Text books have been printed in the native tongues; 45 editions of mass literature and 37 childrens' books have been printed; 8 training schools established; 1,200 students have been sent outside for technical training; 60 houses of culture, and 20 reading huts built; 100 portable cinemas have been distributed; 64 travelling educational political groups organized; 157 medical centres, 1,647 hospital beds and 174 dispensaries care for the

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health of the inhabitants, etc. All this array of attainments seems to indicate positive progress in the Arctic, yet on examination of the statistics, much divergence of statements is shown. Of course, with the great number of Committees operating, and not always with a competent administrator, it is not to be wondered at that mistakes have been made. They have been trying to accomplish in a score of years much more than had been done in all the preceding regimes, and more than many countries have done under the same conditions. Hence, the author again points out that the picture presented of what has been done is rather spotty, and that the evaluation of the information emanating from Soviet sources is admittedly difficult, but the fact remains that there is almost a feverish rush of enthusiasts to settle in the North. Whether this is due to real patriotism, or to enforced caution is difficult to determine. The Soviet authorities seem to be co-operating in the movement, however, and are making efforts to provide livable conditions in the outposts. Of course they are sending only those workers, and all good men and true whose loyalty to party ideas is beyond doubt, and who have had some training in trades which are especially useful under Arctic conditions.

The last chapter gives a detailed analysis of the international significance of the Soviet progress in the Arctic. The most significant political repercussion of their Soviet advance is that of the sectorial theory, the strategic northern sea route, and the many aeroplane outposts. As to the sector theory of the division of the Arctic regions, international attention to this has been rather indifferent, although recently a German author suggests that Germany might feel justified in claiming jurisdiction over some of the islands since German scientific expeditions had explored them to some extent.

The sector theory principle was first suggested by Senator Poirier, on February 20, 1907, when he advised that Canada should declare sovereignty over the lands lying between its northern coast and the Pole. Bernier, in 1909, placed a copper plate on Melville Island claiming Canada's ownership to lands within the sector lying between Long. 60° W. and 151° W. (141), and in 1923, the Northwest Territories and Yukon branch of the Department of Interior of Canada published a map showing all the islands in the 60°—141° sector as within Canadian boundaries. In 1925, also, Hon. Mr. Stewart in the House of Commons, stated that Canada claimed all rights up to the Pole between longitudes 60° and 142°. (141).

The claims of Canada, and of others, arising from this sector theory are analyzed from the judicial aspect and from the effective occupation point of view, and many unusual problems that might arise from these principles are discussed. The opinions of several experts are quoted and in conclusion, it is stated that, "the thorough understanding of the issues involved must be accompanied by a universal desire for a solution, a sincere belief in the rationality of mutual co-operation, and immediate concentration of action envisaging a just distribution of the benefits offered by a civilized Arctic".

The book is replete with references, there being 44 pages of bibliography, and 126 pages of appendices quoting various Soviet decrees and statutes.

It is interesting to note in reading some of these statutes, the cropping up of the Soviet ideas of a Godless country, which makes it so difficult for Christian nations to heartily co-operate with any-

thing emanating from the U.S.S.R. In the Red Chum instruction book, one may read the following: "They must struggle against all manifestations of imperialistic chauvinism and local nationalism — conduct anti-religious work, the struggle against shamanism, fight for the destruction of religious conceptions by means of conducting talks on topics of world-creation, origin of man, and other scientific subjects". Also, "the Workers of the North who have manifested their inability to saturate their work with the ideals of Lenin's national policy must be removed from the North."

The Arctic is changing. Soviet Russia is certainly bringing about many of these changes. Dr. Taracuzio's volume is full of information and thought provoking ideas regarding this region, and, read with understanding, it presents one of the best pictures of the U.S.S.R. activities north of the Arctic Circle.

D. A. NICHOLS.

NEW MAPS

Yellowknife Bay Map Sheet: The Department of Mines and Resources has recently published a new map on the scale of four miles to one inch, known as the Yellowknife Bay map sheet. It shows the north arm of Great Slave Lake, Yellowknife River, Pensive Lake, and Gordon Lake.

This map was prepared from air photographs and shows the intricacies of the multitude of lakes and water courses which spread over this country.

Copies may be obtained at twenty-five cents per copy from the Surveyor General, Ottawa.

Jasper Park and Yoho Park: The Department of Mines and Resources has issued new editions of the maps of Jasper Park and Yoho Park. The map of Jasper Park is issued in two sheets on a scale of three miles to an inch and that of Yoho Park on a scale of two miles to an inch. They show all topographical information including railways, roads, post offices, wardens' cabins, contours, etc.

Copies of these maps may be obtained at fifteen cents per sheet from the Surveyor General, Ottawa.

Charlottetown-Sydney Map Sheet: A new map of the Charlottetown-Sydney area in the Maritime Provinces is now available for distribution according to an announcement from the Department of Mines and Resources. This map, on a scale of eight miles to an inch, includes nearly the whole of Prince Edward Island and over half of Nova Scotia, as well as a small point of New Brunswick.

Over one-half of Nova Scotia is shown on the new map including the island of Cape Breton, which is separated from the mainland by the narrow Strait of Canso. This island lying south of the main entrance to the Gulf of St. Lawrence and sheltering Prince Edward Island from the Atlantic, is roughly 100 miles in length with an extreme breadth of 87 miles. Its area of 3,120 square miles encloses the salt-water lakes of Bras d'Or, connected with the sea at the north by two natural channels, and at the south by the St. Peters ship canal. The ridge of low mountains running through the centre of the Nova Scotia mainland, the highest altitude of which is less than 1,500 feet, divides it roughly into two slopes. That facing the Atlantic is generally rocky and open to the sweep of Atlantic storms, but the other facing Northumberland Strait

(Continued on page XI)

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KLONDIKE RICH IN PLACER GOLD

The famed Klondike placer fields of Yukon continue to be an important source of gold, producing some \$2,000,000 worth of the precious metal annually, according to the Department of Mines and Resources, Ottawa. Chief Canadian source of placer gold, the Klondike contains sufficient reserves, it is claimed, to keep the dredges now working in operation for more than fifteen years. Modern engineering has shown that the Klondike contains

much larger reserves of placer gravels than was formerly regarded as probable, and with large areas still to be tested it is expected that placer gold mining in Yukon will continue to be an important industry for many years to come.

Placer gold mining operations in Yukon are now carried out on a large scale, huge dredges operated by hydro-electric power having replaced the pan, rocker and sluicing methods of the early Klondike days.

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embraces, for the most part, fertile plains and river valleys noted for general farming. The Atlantic Coast is deeply indented with numerous excellent harbours, many of which are the homes of old sail-fishing fleets.

Copies of this map may be obtained from the Surveyor General, Ottawa, at 25 cents per copy. One copy will be furnished free to any school situated within the area upon application of the principal.

TRANSATLANTIC FLYING BOATS

The four Short S. 30 transatlantic flying boats, which embody special apparatus for taking on extra fuel in mid-air from "tanker" aircraft, are completing trial flights previous to the commencement this summer of a service from Southampton to Montreal. Their names are "Cabot", "Connemara", "Clyde", and "Caribou".

NEW LABORATORIES IN OTTAWA

Provision has been made for the expenditure of \$1,459,895 in the construction of new aeronautical and other laboratories of the National Research Council. These will be established on a site of about one hundred acres, recently acquired in the vicinity of Ottawa-Rockcliffe Aerodrome.

The facilities to be provided on the new site will include those now in service in the present annex laboratories, but will be of increased range or capacity to cope with present and future demands.

Aeronautical facilities to be installed will include an aerodynamic laboratory, equipped with large and small wind tunnels, a vertical spinning tunnel

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and accessory equipment, a model-testing basin, an engine-testing laboratory, gasoline and oil laboratory, aircraft instrument laboratory, and an engineering laboratory.

The large wind tunnel will have about twice the capacity of the present tunnel, which is 9 feet in diameter and provides for a speed of 160 m.p.h. The basin will be 25 feet wide and 600 feet long. It will permit the testing of models of hulls of vessels, as well as of aircraft floats and hulls. There is not in Canada, at the present time, a vertical tunnel for studying the spinning characteristics of aircraft. The engine laboratory will comprise two test-beds, one for engines developing up to 500 horsepower and the other capable of testing engines developing up to 1,000 horsepower. In the engineering laboratory, full-size aircraft components will be tested for strength.

A hydraulic laboratory will be provided and will be equipped with the large glass-walled flume now installed in the present laboratories, and there will be ample floor for river models. This laboratory will permit the conduct of investigations concerned with hydraulic power developments, canals, river improvement, harbours, irrigation, etc. Test work of this character has had to be referred in the past to laboratories in Germany.

A high voltage laboratory is to be built, in which tests and investigations, at voltages as high as 1,500,000, may be made. This will make available to Canadian manufacturers of high-voltage equipment and to the Canadian power-transmission industry facilities for test and research work on high-voltage cables, insulators and other apparatus, which is essential to development and progress in a major Canadian industry.

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GOOD NEWS FOR FISHERMEN

More than thirty-three million little salmon and trout were distributed in suitable waters in the Maritime Provinces and British Columbia by the Canadian Government during 1938. The principal species liberated included 21,600,000 Atlantic salmon, 10,500,000 speckled trout, and more than one million sockeye salmon. Other fish distributed in smaller numbers were rainbow trout, ouananiche, Sebago salmon, hybrid brown trout, and salmon trout. Most of the fish set free were in the fingerling stage, although some of them were one or two years old, and the trout included some adults of four years.

About 95 per cent of these salmon and trout had been fed in hatchery ponds for varying lengths of time before being released. These hatcheries are operated by the Dominion Department of Fisheries for the purpose of maintaining and improving fishing in areas where the fisheries are under federal administration. With the same purpose in mind more than 46,400,000 eggs of Atlantic salmon, speckled trout, sockeye salmon, rainbow trout, and other species, were collected in 1938 for use in future re-stocking operations.

While the major phase of fish culture work carried on by the federal government is the propagation of commercial fish, the needs of the sportsman have not been overlooked, and the planting and restocking of game fish in the streams and lakes of the national parks is of particular interest to anglers. Hatcheries are maintained by the Department of Mines and Resources in Banff and Waterton Lakes National Parks, with a sub-hatchery in Jasper National Park. During 1938 fish culture operations were carried out in Jasper, Waterton Lakes, Banff, Prince Albert and Riding Mountain National Parks.

BIRD LIFE OF THE SOUTHERN PLAINS

To a marked degree the bird life of the Great Plains of extreme Southern Saskatchewan and

Alberta embraces representatives of an environment known to naturalists as the Upper Sonoran Zone. The peculiarity of bird life in this singular Canadian region, particularly in the area known as the Coteau de Missouri where the drainage is south to the Missouri River, is pointed out by the District Migratory Bird Officer of the Department of Mines and Resources, who says it contains many species unfamiliar to the average Canadian ornithologist.

The region with an average elevation of about 3,000 feet, is a vast sweep of treeless terrain, often relieved by prominent hills and ridges. Two wooded plateaus, known as Cypress Hills and Wood Mountain, rise high above these plains; Cypress Hills attaining an elevation of more than 4,000 feet above sea-level. Streams have usually cut their valleys deeply, often introducing fantastically sculptured badlands of spectacular character. Much of the country is wild and rugged, sparsely settled and chiefly devoted to ranching.

Among the birds visiting this region, to name only a few, are burrowing owl, Sennett's nighthawk, Bullock's oriole, rock wren, lark bunting, dickcissel, western lark sparrow, desert horned lark, long-tailed chat, sage grouse, McCowan's longspur, sage thrasher, long-billed curlew, and Arkansas kingbird. Many of these species resort to the open shortgrass plains where cover is scant or absent. Others again are attracted to the greasewood flats, or to the areas of sagebrush and cactus predominant on valley floors, benches, buttes and coulees of the ruggedly eroded badlands. Stream margins which support a brush growth of willows, cotton-wood, buffaloberry and buckthorn attract many distinctly southern birds. Although there is a strange regional overlapping of numerous forms of bird life that are ordinarily characteristic of both humid and arid environments, each species adheres to its favourite local habitat.

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Cranbrook — Lethbridge Map Sheet—The Department of Mines and Resources, Ottawa, advises that its Hydrographic and Map Service is engaged in the preparation for aeronautical purposes of a new series of eight-mile maps of areas across the Dominion. One of the series, the Cranbrook-Lethbridge map just issued, covers an area extending from latitude 48° to latitude 50°, one-half of which is in the United States. The map shows all topographical features important as land marks from the air, and as much other similar information as the scale of the map will permit without making it too confused for easy reading by the pilots.

The outstanding physical feature of the region is the Rocky Mountains, the main continental divide. The crest of this range in Canada forms the boundary between Alberta and British Columbia. This boundary has been surveyed, and a series of map sheets is available showing it in detail.

Part of three different watersheds are shown on the new map, namely that drained by the Kootenay River, which rises far to the north, loops southerly into the United States, and then returns to Canada, where it joins the Columbia River on its way to the Pacific Ocean; by the Oldman River, a tributary of the South Saskatchewan River, the waters of which eventually reach Hudson Bay; and by the Milk River, in Alberta, a tributary of Missouri River. Thus it will be noted that a part of Alberta is included in the Mississippi watershed.

Copies of the Cranbrook-Lethbridge map may be obtained from the Hydrographic and Map Service, Department of Mines and Resources, Ottawa, at 25 cents a copy.

